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P.J. Chandler, A.J. Halstead, N. Hall, A.W. Jones,
A.J. Pickles and R.D. Hawkins

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ODONATA

OTHER PABULA

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BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Registered charity number: 213149

Meetings of the Society are held regularly in London, at the rooms of the Royal Entomological Society, 41 Queen's Gate, London SW7 and the well-known ANNUAL EXHIBITION and ANNUAL DINNER are planned for Saturday 30 October 1993 at Imperial College, London SW7. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary, R. F. McCormick, at the address given below.

The Society maintains a library, and collections at its headquarters in Dinton Pastures, which are open to members on the second and fourth Sundays of each month, telephone 0734-321402 for the latest meeting news.

Applications for membership to the Membership Secretary: A. Godfrey, 10 Moorlea Drive, Baildon, Shipley, West Yorkshire BD17 6QL.

Subscriptions and changes of address to the Assistant Treasurer: G. N. Burton, Mar-y-Mar, Minster Drive, Minster-on-Sea, Sheerness, Kent ME12 2NG.

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FURTHER NOTES ON THE SOCIETY'S MOVE TO DINTON PASTURES

The Society's new headquarters, the Pelham-Clinton Building, was completed in August 1992, the library was installed in September and the collections arrived shortly afterwards. Tony Pickles took over as Treasurer amidst the Society's deliberations on what to do and where to go after leaving the Alpine Club in London's West End. He offers here a few personal thoughts on events at the time.

Fig. 1. The last Council Meeting to be held at the Alpine Club, on 14 December 1989. Clockwise around the table from bottom left are: S. R. Miles, R. S. Tubbs, R. S. Key, A. J. Halstead, M. K. Henderson, C. W. Plant, I. D. Ferguson, R. D. Hawkins, J. A. Owen, P. J. Chandler and R. A. Jones. Unfortunately out of shot at the "head of the table" are Mrs. F. M. Murphy, then President of the Society, J. M. Muggleton, then Secretary, and I. F. G. McLean who took the photograph. Council meetings took place in the Alpine Club's council room hence the mountainscape photographs around the wall.

When I became the Society's Treasurer in January 1991 the move to Dinton Pastures was by no means certain and Council had yet to be convinced that this was viable, let alone the best option for the future.

My part in the process was to prepare budgets based on various ideas of the possible cost of constructing a headquarters building at Dinton Pastures and see whether or not we could afford the capital cost and the expected future running costs. My conclusions were that we could, and that furthermore it would be less expensive to pursue the Headquarters building at Dinton Pastures than we could realistically expect any other option to be. So it seemed to me the correct move from an economic point of view even without the advantages for the Society we hope will flow from the move.

Once Council had decided to go ahead with the Dinton Pastures project and a tender had been accepted after enquiry into the financial standing of the building company,

Figs 2 & 3. The Pelham-Clinton Building nearing completion in July 1992.

C. W. Rawlings, my role was to arrange for finance to be available to pay the various bills as they came due whilst losing as little interest as possible on our investments. Luckily it was not necessary to sell any of our long-term investments as the stock exchange was depressed during this period, all payments were made from our interest-bearing deposits instead.

Inevitably in a building project snags occur which change the cost originally envisaged and this has been the case with us. Our budget was generous however, given that the slump in the building trade meant we were able to secure a tender considerably below our first estimates. We await some final costs and then it will be possible to adjust our holdings to the best advantage, but I have no doubt that the Society will be in a position to meet its costs at Dinton Pastures for the foreseeable future without undue pressure on our resources.

A. J. PICKLES

FUNDING FOR DINTON PASTURES

Once details of the lease for the Society's building at Dinton Pastures had been finalized and its contruction became an imminent reality, a number of charitable trusts was approached to see if they would help by making a contribution towards the costs. As a result grants of £2000 and £10 000 have been received from the William A. Cadbury Charitable Trust and the Esmée Fairbairn Charitable Trust respectively. The Society gratefully acknowledges this generous assistance which has helped to provide a secure home for the library and collections.

Fig. 4. The Pelham-Clinton Building completed August 1992.

BOOKS REVIEW

Mosquitoes by K. R. Snow, Naturalists' Handbooks 14, 1990, 66 pages. **Insects, plants and microclimate** by D. M. Unwin and S. A. Corbet, Naturalists' Handbooks 15, 1991, 68 pages. **Weevils** by M. G. Morris, Naturalists' Handbooks 16, 1991, 76 pages. Each available in paperback (£7.95) and hardback (£13).—This excellent series continues with these three titles. The main emphasis in each is the ecological study of a particular group or in a particular habitat. Each handbook contains identification schemes, notes on ecology and natural history and (most importantly) offers a 'springboard' from which to attempt very real research and scientific study. When reading textbooks or monographs it is all too easy to get the impression that entomology is the domain of the doctoral student or the professorial researcher, and that only such of us who might have the odd scanning electron microscope available to us can hope to make any valid contribution. These handbooks aim to show how very little is really understood about even the commonest and most ubiquitous of creatures, and how even a garden shed laboratory stocked with jam jars, cotton buds and old saucepans can produce valuable and lasting additions to our knowledge.

Because of their medical importance across the globe, mosquitoes are amongst the most studied of flies, but their popularity with British amateur naturalists is not high. Unlike many insects, they do not have to be sought, all too eager are they to seek us out and have their wicked way with our blood. Many of the common species are prettily marked and moderately easy to identify. They are easy to breed in almost any water-filled container, and the larvae can be identified in their later instar stages. Thus, they lend themselves to a wide variety of ecological studies. It is even possible to carry out chromosomal studies under a moderate magnification of $\times 1000$, because of the giant chromosomes present in the mosquito salivary glands. Unlike other handbooks in the series, the colour identification plates are not newly commissioned figures, but reproductions of the delicate paintings by A. J. E. Terzi in the Natural History Museum.

Study of any number of insects quickly leads us to the conclusion that precise habitat requirements are often minutely specific, for example the effect of grass length on the survival of various species of 'blue' (Lycaenidae). Food-plant selection is still only approximately understood; very often one patch of food-plant will have a particular insect feeding upon it, another patch will not. By studying the minute differences in temperature, humidity, aspect, shading, etc, it may be possible to discover just what it is that particular species require to live and thrive. These studies do not require banks of highly sophisticated and expensive machinery. Armed with simple mercury thermometer and a 'wiggly wire' it is possible to accurately measure the dew point. Other slightly more elaborate instrumentation is detailed, most of the components for which can be ordered through mail-order catalogues at reasonable prices.

Weevils are one of the most interesting groups of beetles to study because so many of them are specific to particular food-plants and can be monitored by sweeping, beating or manual searching throughout the season. Many are characteristically patterned or coloured, and are enchanting creatures under even low-power magnification. The key to weevil groups is excellent, and the keys to weevil species based on foodplants is a novel idea that works well for the commoner species. This handbook goes further than many in actually listing 13 'unanswered questions about weevils' and suggesting practical ways in which they might be studied. These vary from discovering the foodplant range for a species to observing how weevils react when they fall into water!

The amateur naturalist or A-level student will find much to interest them in these titles, and may even be stimulated to try out a personal theory or two.

RICHARD A. JONES

THE HOLARCTIC SPECIES OF THE *MYCETOPHILA FUNGORUM* (DE GEER) GROUP (DIPTERA: MYCETOPHILIDAE)

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Laffoon (1957) first recognized that *Mycetophila fungorum* (De Geer, 1776), the earliest described and one of the commonest and most distinctive fungus gnats, belonged to a group of sibling species. He accepted three species of the group in North America, all of them widespread there: *M. thioptera* Shaw, *M. fisherae* (Laffoon) and a third considered conspecific with the European species *fungorum* (De Geer). Eight other names based on European types and the Indian *M. khasiensis* Senior-White (1922) were placed in synonymy under *fungorum*.

It has recently been realized that European, including British, material of '*fungorum*' consists of at least two species, separable at present only on details of the structure of the male genitalia. Both are widespread and common although one of them strongly predominates in Mediterranean material; it does, however, occur in northern Europe where the other species (considered the true *fungorum*) is more common and both species have been found in most parts of Britain.

Laffoon (1957) selected a female as lectotype from two syntypes of *fungorum* (De Geer) but characters to separate the females of the two European species are as yet uncertain. However, De Geer (1776) had males and figured the male genitalia, preceding Dziedzicki's pioneering work on fungus gnat genitalia by more than a century. Both his figures and those of Dziedzicki (1884) under the name *punctata* Meig. represent the species recognized here as *fungorum*. None of the other synonyms have been figured; possible type material of some of them exists but it has not yet been practicable to examine them. The holotype of *khasiensis* (in Natural History Museum, London) has been examined, but it is a female and it cannot be confirmed whether it is conspecific with one of the European species. It is uncertain whether *M. pallida* (Bukowski, 1934), of which the type is presumed lost, belongs to this group. According to Bukowski's figures, its ventral stylomere resembles that of the species described here as *perpallida* sp. n., but the dorsal stylomere shows a different structure and the figure may be inaccurate. In any case, *pallida* is a junior secondary homonym of *pallida* Stannius, 1831 (= *Exechia seriata* (Meig. 1830)) so could not be used.

Although it is possible that one of the other published names refers to the second European species, it is considered desirable to describe this species as new so that its existence may be made known. Examination of North American material has confirmed that *perpallida* differs from any of the species known to Laffoon; *fisherae* and *thioptera* are quite well characterized but the North American material determined as *fungorum* by Laffoon has been found to comprise at least three undescribed species although some specimens from Alaska and Canada (Ungava Bay, Northern Quebec) are probably true *fungorum*.

It thus appears that there is a group of sibling species around *fungorum* comparable to the closely related *ruficollis* Meig. group. Examination of material from other parts of the world will probably add further species to this group.

The *fungorum* group is easily recognized within the genus *Mycetophila*, being characterized by the absence of ventral bristles on the middle tibia, the absence of anterodorsal bristles on middle and hind tibiae, the long vein tb (= 'M before r-m' of Laffoon) without setulae below (in contrast to the presence of these setulae in the *ruficollis* group) and the wings clear yellowish without markings. The body is largely

dull yellow although darker (more or less brown or grey dusted) individuals are frequent, especially in the winter months.

M. fisherae has the posterior preapical setae of the hind coxae long and bent apically in both sexes; the other species have not yet been separated other than on genital characters. The chief differences are found in the arrangement of setae on the ventral stylomere of the gonostylus and in the shape of the basal margin of its dorsal stylomere. The aedeagus is also figured here for each species but does not show strongly specific characters.

Laffoon suggested that *fungorum* might be divisible into subspecies and mentioned that many south-western US specimens had the apical setae of the ventral stylomere spaced and shaped differently. These may correspond to *neofungorum* sp. n. or *favonica* sp. n. of the present paper.

Laffoon illustrated small differences in the ovipositor structure of his three species but it has not yet been possible to separate females in this respect in the species hitherto confused with *fungorum*.

The species descriptions are brief in view of the paucity of external distinguishing characters; *fisherae* and *thioptera* were described in detail by Laffoon but the other Nearctic species were evidently included in his description of *fungorum*. The chaetotactic characters of pleura and legs given are variable within species.

Development is in a wide range of soft fungi and all species evidently vary widely in size due to the variability in available larval food sources.

Mycetophila perpallida sp. n.

Male. Head yellowish brown. Antennae yellow on basal segments, the flagellum mainly dark grey dusted. Palpi yellow, with the third segment broadest. Mesoscutum pruinose, yellow with three separate more or less strongly indicated brown stripes. Scutellum brown, yellow apically. Pleura mainly brown. Legs including coxae yellow. Abdomen yellowish brown, genitalia yellow. Wings clear yellowish; cross vein r-m a little longer than stalk of median fork. Long basal cross vein tb (= M before r-m of Laffoon and earlier authors) bare. [Body may be darker, brownish and more or less strongly grey dusted in some specimens as in other species of the group.]

Proepisternum and mesepimeron each with 6 setae. Middle tibia with 4 a, 4 strong d (1 weaker basal to them), 2 strong preapical p with about 5 shorter basal to them. Hind tibia with 6 a, 4 strong d (1–2 weaker basal to them), 13–15 p on apical two-thirds. Hind coxa with short weak p setae, the preapicals straight and shorter than coxal diameter. Wing length 2.9–5.6 mm. The male genitalia are shown in Figs 4–6.

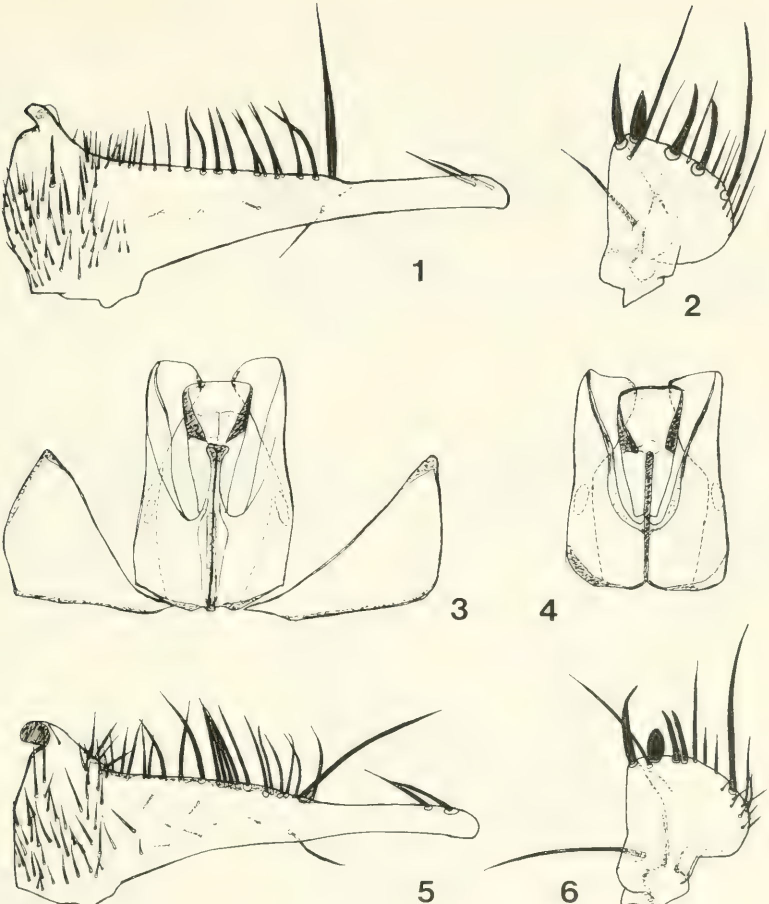
Holotype male. Montenegro, Kolasin, 5–9.vi.1958, wet gorge in old forest (R. L. Coe, Natural History Museum, London).

Paratype males: same data as holotype, 6 males; Slovenia, Hudajuzna, 390 m, 31.vii–4.viii.1973, male (A. E. Stubbs); Spain, Sierra de Guadarrama, 6-8000′, viii.1927, male (B. P. Uvarov); Corsica, Tavignano Forest, 10–25.ix.1928, male (F. W. Edwards) (all above, Natural History Museum, London).

Other material. Many males from France (including Corsica), Spain, Greece (including Crete), Czechoslovakia, Finland, British Isles and Madeira.

Mycetophila fungorum (De Geer, 1776)

Male. Coloration and wing characters as *perpallida*. Proepisternum with 4–5 setae, mesepimeron with 4–6 setae. Middle tibia with 3 a (1 weak basal), 4 d (1 weak basal), 6–9 p (1–3 apical stronger). Hind tibia with 5–6 a, 4 strong d (1 weaker basal),



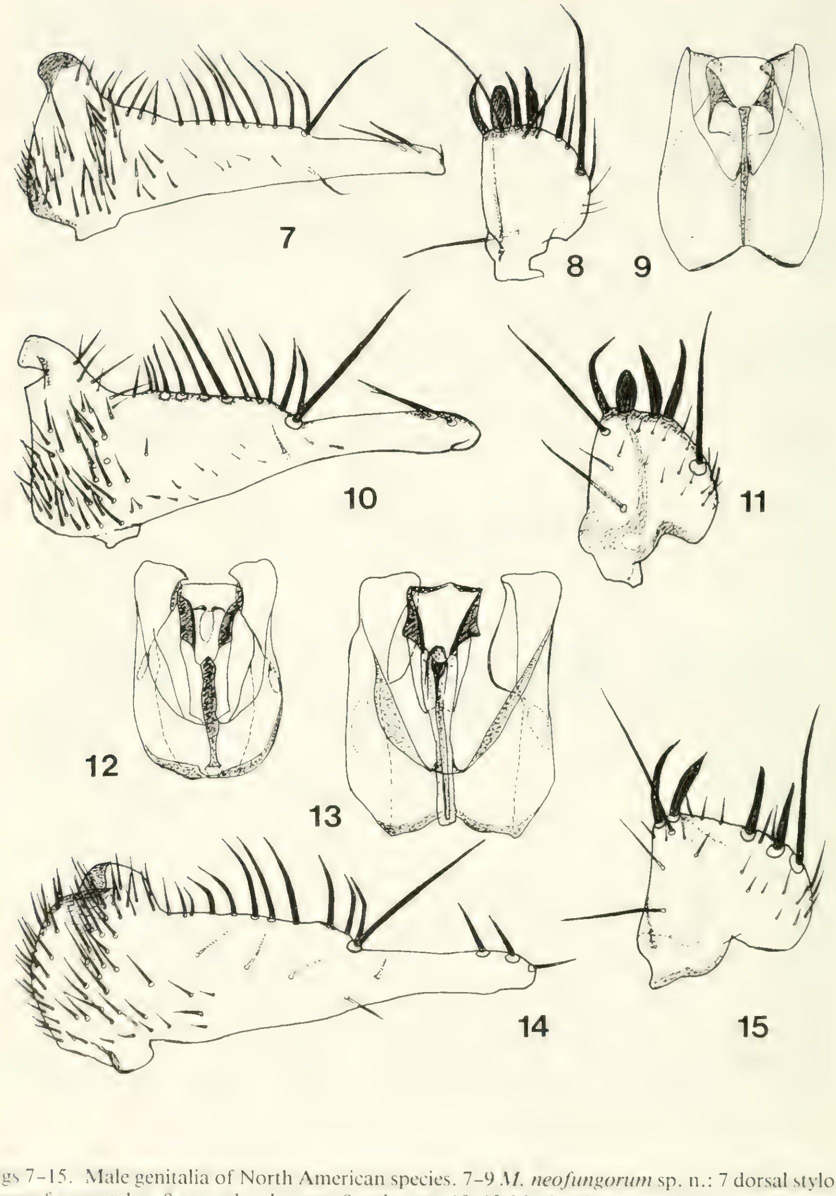
Figs 1–6. Male genitalia of European species. 1–3 *Mycetophila fungorum* (De Geer): 1 dorsal stylomere of gonostylus; 2 ventral stylomere; 3 aedeagus. 4–6 *M. perpallida* sp. n.: 4 aedeagus; 5 dorsal stylomere of gonostylus; 6 ventral stylomere.

12–14 p on apical two-thirds. Hind coxa with p setae short and weak, preapicals straight, shorter than coxal diameter. Wing length 3.4–5.2 mm. The male genitalia are shown in Figs 1–3.

Material examined. Many males from Sweden, Finland, France, Spain, Czechoslovakia and British Isles; also a few examples from Alaska and Canada.

Mycetophila neofungorum sp. n.

Male. Coloration and wing characters as *perpallida*. Proepisternum with 4–6 setae, mesepimeron with 4–8 setae. Middle tibia with 3 strong a (1 weaker basal to them),



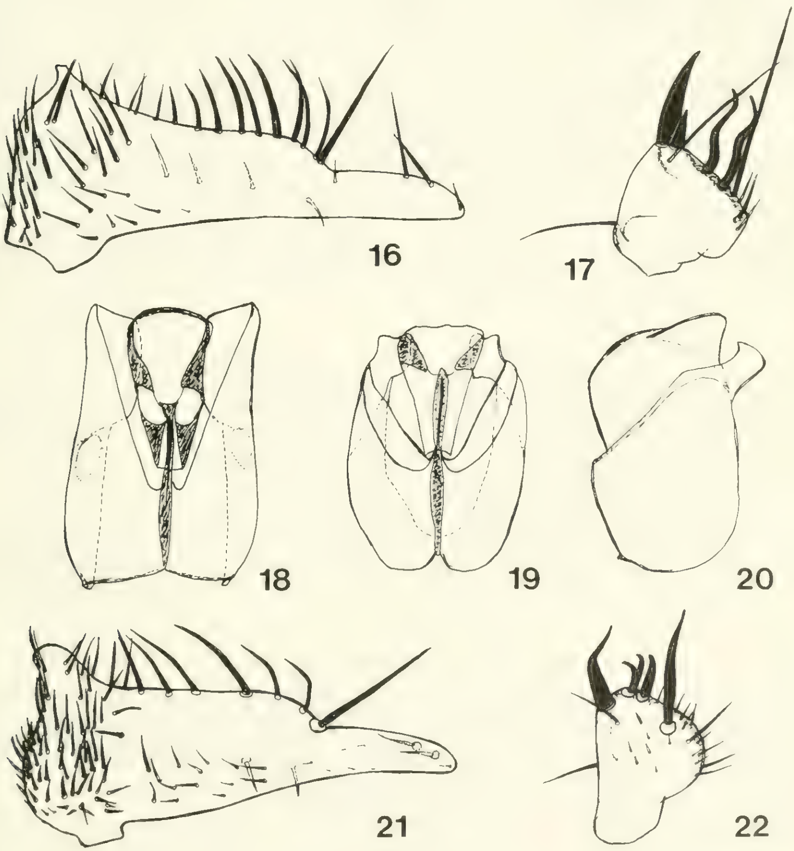
Figs 7–15. Male genitalia of North American species. 7–9 *M. neofungorum* sp. n.: 7 dorsal stylomere of gonostylus; 8 ventral stylomere; 9 aedeagus. 10–12 *M. riparia* sp. n.: 10 dorsal stylomere; 11 ventral stylomere; 12 aedeagus. 13–15 *M. favonica* sp. n.: 13 aedeagus; 14 dorsal stylomere; 15 ventral stylomere.

1 strong p (5 weak p basal to it). Hind tibia with 6 strong a, 5 strong d (2 short, weak between them), 7 p on apical half. Hind coxa with short weak p up to half length of preapicals which are straight to gently curved. The male genitalia are shown in Figs 7–9.

Holotype male USA, Arizona, Grand Canyon National Park (north rim), 15.vii.1954 (W. L. Downes, Natural History Museum, London).

Mycetophila riparia sp. n.

Male. Coloration and wing characters as above species. Head and scutellum mainly yellow, brownish on disc. Proepisternum with 4–5 setae, mesepimeron with 6 setae. Middle tibia with 3 strong a (1 weaker basal), 3 strong d (1 weaker basal), 8–10 p



Figs 16–22. Male genitalia of North American species. 16–18, *M. fisherae* (Laffoon): 16 dorsal stylomere of gonostylus; 17 ventral stylomere; 18 aedeagus. 19–22 *M. thioptera* Shaw: 19 aedeagus, dorsal view; 20 aedeagus, lateral view; 21 dorsal stylomere; 22 ventral stylomere.

(2–3 apicals stronger). Hind tibia with 5–6 strong a, 4 strong d, 9 (Fairbanks)–16 (Matanuska) p on little more than apical half. Hind coxa with p setae very weak, preapicals straight, shorter than coxal diameter. Wing length 4.6–4.9 mm. The male genitalia are shown in Figs 10–12.

Holotype male. USA, Alaska, Fairbanks, 28–29.vii.1944 (J. C. Chamberlin, United States National Museum, Washington DC).

Paratype male. USA, Alaska, Matanuska, 4.vi.1944, rotary trap (J. C. Chamberlin, United States National Museum, Washington DC).

Mycetophila favonica sp. n.

Male. Coloration and wing characters as above species. Mesoscutal stripes relatively faint. Proepisternum with 5 setae, mesepimeron with 5–6 setae. Middle tibia with 3 strong a (1 weaker basal), 4 strong d (1 weaker basal), 8–9 p (1–2 apicals stronger). Hind tibia with 6–7 a, 4 strong d (1 weaker basal), 14–16 p on apical two-thirds. Hind coxa as in *riparia*. Wing length 4.0–6.2 mm. The male genitalia are shown in Figs 13–15.

Holotype male. USA, California, Palo Alto, 22.i.1985 (R. W. Doane, United States National Museum, Washington DC).

Paratype males. USA, California, Alameda County, Strawberry Canyon, ii.1949, light trap (W. W. Wirth); USA, California, Alpine County, 8.x.1953 (C. S. Richards); USA, Nevada, Verde, 22.viii.1953 (C. S. Richards) (all United States National Museum, Washington DC).

Other material. California, Claremont, Baker (J. M. Aldrich); Idaho, Moscow Mountain, 4.viii.1915, 24.vi.1919 (A. L. Melander) (all United States National Museum, Washington DC).

Mycetophila fisherae (Laffoon, 1957)

Material examined has wing length 4.0–5.2 mm (Laffoon gives the wider range 3.0–5.6 mm). The male genitalia are shown in Figs 16–18.

Paratype male examined. USA, Massachusetts, Amherst, light trap, 1.x.1951 (E. L. Coher, Natural History Museum, London).

Other material examined. USA, Iowa, Ledges State Park, 6.v.1950, male (E. L. Coher); USA, New York, Tuxedo, viii.1928, male (F. W. Edwards) (both Natural History Museum, London). USA, Louisiana, Independence, 23.ii–1.iii.1990. Malaise trap, 2 males, 1 female (received via R. S. George, P. J. Chandler collection).

Mycetophila thioptera Shaw, 1940

Material examined (23 males, 33 females, from many parts of USA) has wing length 3.2–4.8 mm (Laffoon gives the wider range 3.1–5.5 mm). The male genitalia shown in Figs 19–22 are drawn from a specimen from Louisiana, Ruston, 18.xi.1941 (W. W. Wirth, United States National Museum).

Acknowledgements

I am grateful to the authorities of the Natural History Museum, London and the United States National Museum, Washington DC for the opportunity to study the North American material which has been useful in widening knowledge of the extent of this species group.

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SHORT COMMUNICATIONS

Some uncommon insects from two waste-ground sites in South Yorkshire.—I read with interest Mr R. K. A. Morris's comments (*Br. J. Ent. Nat. Hist.* **5**: 186) regarding the value of recording Diptera and Hymenoptera on ruderal sites, a viewpoint I can enthusiastically endorse after working abandoned colliery waste-ground localities over the past few years.

During 1992 a small sheltered corner of the vast Manvers site (SE 4501)—the largest derelict area in the country—produced a number of outstanding wasps, at least in a Yorkshire context, most notably *Nysson dimidiatus* Jurine, *N. trimaculatus* (Rossius), *Gorytes tumidus* (Panz.), *Entomognathus brevis* (V.d. Lind.) and *Pseudomalus violaceus* (Scop.). All these species were noted on at least three occasions. Other more widespread though still locally scarce species included *Ectemnius dives* (Lepeletier & Brulle), *Ammophila sabulosa* (L.), *Tachysphex pompiliformis* (Panz.), *Psenulus concolor* (Dahlbom), *Hedychridium ardens* (Lat. in Coquebert) and *Dipogon variegatus* (L.).

Diptera during 1992 included *Dioctria baumhaueri* Meig., *Sphaerophoria rueppellii* (Wiedemann), *Oxycera morrisii* Curt., *Solva marginata* (Meig.) and *Dolichopus signifer* Hal., this last fly an RDB 2 species almost exclusively confined to a few coastal sites in the south-west. A similar 'rubble-scape' at nearby Cortonwood has also proved to be a fruitful collecting ground for Diptera and Aculeate Hymenoptera although the most remarkable find here is the sawfly *Stethomostus funereus* (Klug) recorded in 1989 and 1992, a species found on only a handful of occasions in Britain.

I should like to thank Mr R. Crossley for confirming and Dr D. Sheppard for identifying the last two above-mentioned insects respectively.—J. D. Coldwell, 16 Railway Cottages, Dodworth, Barnsley, South Yorkshire S75 3JJ.

***Arhopalus rusticus* (L.) (Coleoptera: Cerambycidae) in Joydens Wood, Bexley, Kent.**—Mr Martin Henderson (*Br. J. Ent. Nat. Hist.*, **5**: 187) may be interested in a further record of this local longhorn beetle, *Arhopalus rusticus* (L.). Six larvae of this insect were found in 1991 in Joyden's Wood, Bexley, Kent, TQ500720. They were obtained from hard heartwood of Scots pine which was uprooted in the great storm of 1987. In due course six adults emerged, two of which were presented to the Natural History Museum as all 29 specimens in their collection were found in the area of Nethy Bridge, Inverness, Scotland. The long-term future of this beetle in the wood is uncertain, as the wood is managed by the Woodland Trust and it is their intention to clear the wood of pine and plant broadleaf trees, so returning it to its 1950 status. At present there is a good breeding colony.—K. C. Lewis, 108 Parkview Road, Welling, Kent DA16 1JS.

***Agapanthia villosoviridescens* (Degeer) (Coleoptera: Cerambycidae) new to Gloucestershire.**—A specimen of this beetle was recently passed to me for identification by Mr Colin Twissell. It was found at Cutsdean Quarry Nature Reserve (SP 105315) during an invertebrate recording meeting of the Gloucestershire Naturalist's Society, 30.v.1992. This quarry formerly produced Chipping Norton limestone, and since closure has developed limestone grassland and scrub communities, with areas of rock rubble remaining largely unvegetated. The dominant plants are tor-grass, *Brachypodium pinnatum* (L.), upright brome, *Bromus erectus* Hudson, and gorse, *Ulex europaeus* L., with areas of finer herb-rich grassland and a band of bramble and elder scrub along the eastern edge.

A. villosoviridescens has a predominantly eastern distribution in the British Isles, having been found previously in the Midlands only as far west as Oxfordshire, Warwickshire and Staffordshire (Uhthoff-Kaufmann, 1991). There is also an old record for the Bristol area which cannot be allocated to any particular county (Atty, 1983). It is very localized within its range but can be plentiful where present. I have only taken it on two occasions: Horsey Estate, Norfolk (TG 4623), 26.vi.1986; and Ufton Fields Nature Reserve, Warwickshire (SP 378614), 10.ix.1988.—Keith N. A. Alexander, 22 Cecily Hill, Cirencester, Gloucestershire GL7 2EF.

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Observations on the mating of *Cynthia cardui* (L.) (Lepidoptera: Nymphalidae).—Natural matings in the Nymphalidae are rarely observed, although nuptial flights in the late afternoon are commonly seen. It is now acknowledged that actual mating commences in the evening and extends into the night.

I have been able to obtain natural matings with home-bred *Cynthia cardui* using hanging flight cages in the greenhouse during the summer months without difficulty. The pairings have always occurred in the evening.

On 2.x.91 about 30 freshly emerged *Cynthia cardui* adults were placed in a flight cage. These had been reared in an incubator held at about 24° continuously and with a 15-hour day length. The adults were held under the same conditions and fed on 10% honey solution. The flight cage was kept under regular observation during both light and dark periods but no pairings were noted.

After 7 days and 1½ hours before "lights out", the heating was switched off and the incubator allowed to cool rapidly by opening the doors. The temperature fell swiftly to about 14°, the ambient temperature of the greenhouse. During this period, the adults became extremely active and I observed five matings in quick succession. After 30 minutes, the heating was turned back on and no further matings were seen. The process was repeated the next day and further matings were observed. No further matings occurred on subsequent days with the heating on continuously. I repeated the process on 18.x.92 using fresh stock and the results were similar.

From these observations, it would seem that, at least in *Cynthia cardui*, mating is induced by the evening fall in temperature rather than diminishing daylight.

Perhaps this is an adaptation to promote its breeding in the desert areas of its range where night temperatures fall very rapidly.—K. E. J. Bailey, Dipfield, Thorverton, Near Exeter, Devon EX5 5PJ.

THE HOST PLANT ASSOCIATION AND LIFE HISTORY OF *TRICHOCHERMES WALKERI* FÖRSTER (PSYLLOIDEA: TRIOZIDAE)

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The comprehensive and authoritative handbook by Hodkinson & White (1979) on the identification of British Psylloidea, or jumping plant-lice, includes extensive information on the known host plant associations of the British species (in Appendix 1) and on their life history and phenology (in Appendix 2). A long-term population study of *Trichochermes walkeri* Förster since 1982 has furnished some additional information which supplements, and in part corrects, the data for this species given by Hodkinson & White (1979).

Trichochermes walkeri is a distinctive species on account of the attractively patterned forewings (depicted on figure 234 in Hodkinson & White (1979)) and by virtue of the nymphal development taking place within galls formed by upward rolling of the leaf margin of the host plant, buckthorn (the gall is shown on figure 985 in Docters van Leeuwen (1982)). The final nymphal instar (the fifth) is described and illustrated (figures 126–128) by White & Hodkinson (1982).

Hodkinson & White (1979) give four host plants for *T. walkeri* in their Appendix 1 (page 84) namely:

Rhamnus catharticus L., buckthorn or purging buckthorn;
R. alpinus L. and *R. erythroxylon* which are buckthorns not native to Britain;
Frangula alnus Mill., alder buckthorn.

At Chippenham Fen National Nature Reserve, Cambs. samples of *T. walkeri* galls have been taken annually, initially from two bushes and after 1986 from three bushes of *R. catharticus* at the south east corner of compartment 5 (TL 647694). These samples have enabled the population size of *T. walkeri* to be assessed, and in 1985 regular samples of galls taken through the summer allowed the progress of nymphal development to be recorded. Approximately 5.4 m from the main *Rhamnus* study bush is a single *Frangula alnus* bush, and this has been carefully examined annually for galls of *T. walkeri*. Over the ten years of the study not a single *T. walkeri* gall has been found on the *F. alnus*, though the population of the psyllid has remained established on all *R. catharticus* bushes in the vicinity, and exceeded 17 galls per 100 leaves on the main study bush in 1982, the year of greatest abundance. In view of the absence of *T. walkeri* galls on the *F. alnus* bush, despite strong populations of the psyllid on all nearby *R. catharticus* bushes, it seems very improbable that *Frangula* is a host plant for *T. walkeri*, at least in this country.

Hodkinson & White (1979) in their Appendix 2 (page 87) state that *T. walkeri* has one generation per year, overwinters as an adult (marked with a '?'), has a life cycle of their type 3 (marked with a '?'), and that adults have been observed in June, and in August to October. Observations of *T. walkeri* at Chippenham Fen, supplemented with less detailed studies at Bromholme Lane, Brampton, Hunts. (TL 225709), Foulden Common, West Norfolk (TF 7600), and Cavenham Heath National Nature Reserve, West Suffolk (TL 757728), have confirmed that this species has one generation per year, but have revealed a different life history from that suggested by Hodkinson & White (1979).

In the Autumn of 1982 small orange eggs were first observed on twigs of *R. catharticus* from Chippenham Fen, often close to buds. These eggs measure about 0.38 mm long by

0.14 mm wide and are pointed at one end, rounded at the other. It was thought likely that these were *T. walkeri* eggs and this has been confirmed by later observations.

An adult female *T. walkeri* was captured in a sample of twigs obtained from a *R. catharticus* bush at Bromholme Lane, Brampton, in October 1990. This female was confined in a plastic box with a small *Rhamnus* spur which already had about three of the orange eggs present. The female *T. walkeri* was observed making probing movements with her ovipositor around the spur, and a few days later additional orange eggs were noted in their typical positions, that is in depressions formed from old bud scale scars. This confirms that *T. walkeri* females lay small orange eggs on *Rhamnus* twigs during autumn.

On 18 May 1986 two first-instar psyllid nymphs were found on a *Rhamnus* twig at Chippenham Fen NNR. These were brought home and placed on a small potted *Rhamnus* on the evening of 19 May, and one was observed feeding on a leaf margin on 20 May. By 22 May this nymph was enclosed in a small leaf roll, which soon assumed the characteristic appearance of a *T. walkeri* gall. The growth of the leaf and associated gall are shown on Figure 1. An adult *T. walkeri* was observed to have emerged from this gall on 24 August 1986. This confirms that *T. walkeri* hatches in spring from overwintering eggs.

To summarize, the evidence from these observations indicates that *T. walkeri* overwinters in the egg stage, that egg-hatch takes place in May (shortly after bud-burst of *Rhamnus*) with the growth and development of galls proceeding as the leaves expand (see Figure 1). This is a type 1 life cycle as defined by Hodkinson & White (1979) (on page 2).

It is of interest that the gall produced by *T. walkeri* continues to increase in size after the leaf has ceased growing (Figure 1). This suggests that the metabolism of the host plant is modified by the insect forming the gall, so that growing leaf tissue is available after the time when leaves would normally have finished expanding. Sap-sucking insects, such as aphids and psyllids, are typically associated with actively growing, or senescent, plant tissue where food quality is good (see Dixon (1985) for

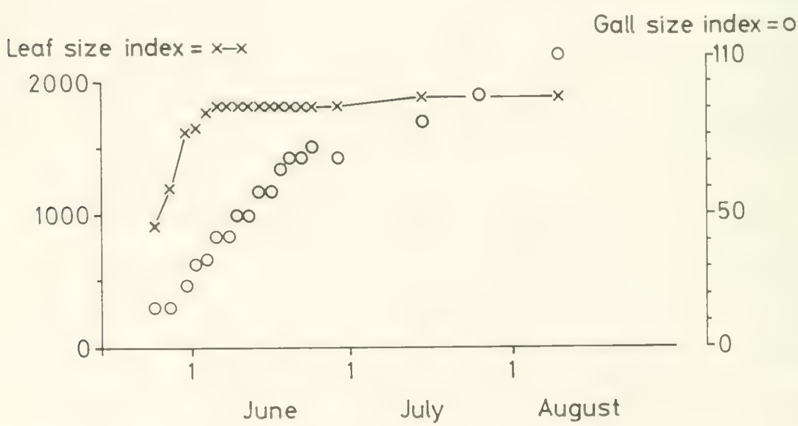

Fig. 1. Growth of a *Rhamnus* leaf and an associated *T. walkeri* gall in 1986. The leaf size index is leaf length (mm) multiplied by leaf width (mm); the gall size index is the gall length (mm) multiplied by gall width (mm).

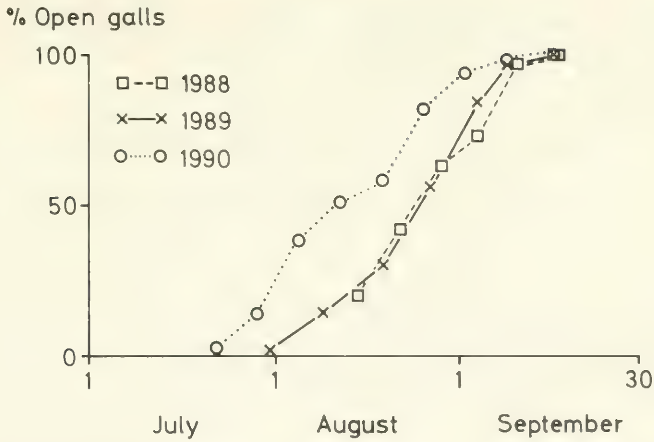

Fig. 2. The proportion of open galls of *T. walkeri* on a *Rhamnus* bush at Chippenham Fen NNR 1988–1990. On each visit 50 galls were examined in 1988 and 1989, and 100 galls were examined on each visit in 1990.

examples and discussion concerning aphids). During the summer, when trees and shrubs provide poor nutrition, a gall-forming life history is one way in which good nutritional conditions can be maintained for the actively growing early stages of sap-sucking insects.

The emergence of *T. walkeri* from galls has been studied at Chippenham Fen. The proportion of open galls, from which adult *T. walkeri* have emerged has been recorded on the main study tree since 1988. The results are presented on Figure 2, and they show that the first adults emerge from late July onwards. The earliest emergence was in 1990, an exceptionally advanced year due to the high spring and summer temperatures. It seems unlikely that, at least in East Anglia, *T. walkeri* adults could emerge from their galls as early as June (as reported by Hodkinson & White (1979)). Detailed observations of the timing of egg laying (made at Bromholme Lane, Brampton from September to December 1990) showed that females continue to lay eggs into October. Records of adult *T. walkeri* in water traps placed under the study bushes at Chippenham Fen in autumn 1991 continued into November, with the last record being a single female for the period 17 November to 1 December 1991. Therefore, the period of adult activity observed in this study has been from July to November.

Acknowledgements

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SHORT COMMUNICATION

***Anitys rubens* (Hoffmann, J. J.) (Coleoptera: Anobiidae) new to Gloucestershire, and other deadwood beetles from Sherborne Park**.—Sherborne Park (SP 1715) was first visited by the National Trust's Biological Survey Team in 1985, prior to its acquisition, and when little deadwood was available for investigation. Despite this, a few interesting deadwood Coleoptera were found, including *Abraeus granulum* Er. (Alexander, 1987) (still the only record for the county), and *Thanasimus formicarius* (L.). Since the Trust's acquisition, fallen trees and major limbs have largely been left *in situ*, and a return visit by the Survey Team on 24.viii.1992 found a much richer deadwood fauna than had been expected. One split fallen oak had exposed its well red-rotted heartwood and dead *Anitys rubens* were plentiful amongst the powdery rot. The red-rot was due to the fungus *Laetiporus sulphureus* (Bull. ex Fr.) which was extensively developed in the tree. *Anitys* was previously unknown in the county (Atty, 1983).

Under bark on the same tree was a specimen of another rare deadwood beetle, *Lyctus brunneus* (Steph.); interestingly, the only wild record for the county, as Atty (1983) gives only a 40-year-old record from Gloucester, where presumably it occurred as a timber pest. Other deadwood beetles found within the parkland on the same date included *Sinodendron cylindricum* (L.), *Ctesias serra* (F.), *Orchesia undulata* Kraatz, *Mycetophagus piceus* (F.), *Eledona agricola* (Herbst) and *Prionychus ater* (F.). *Triplax russica* (L.) had been found on the bracket fungus *Inonotus hispidus* (Bull. ex Fr.) growing on an old ash close by on 16.vii.1992.

The estate includes another historic parkland, Lodge Park (SP1412), and this also holds an interesting deadwood fauna. The 1985 survey noted *Mycetophagus atomarius* (F.) and *Anaglyptus mysticus* (L.), while a visit in 1990 yielded *Bitoma crenata* (F.), *Pediacus dermestoides* (F.), *Ctesias serra*, *Tetratoma fungorum* F. and *Thanasimus formicarius*.

Sherborne Park was apparently developed from an extensive area of pasture woodland in the late 16th century, while Lodge Park was enclosed in the early 17th century and incorporates part of an ancient wood. Thus a long and unbroken history of old trees is clearly the case for both sites and ties in well with the unusually rich deadwood fauna.—Keith N. A. Alexander, National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1QW.

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THE DISTRIBUTION AND HABITAT REQUIREMENTS OF THE TIGER BEETLE *CICINDELA GERMANICA* LINNAEUS (COLEOPTERA: CARABIDAE) IN SOUTHERN BRITAIN

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Introduction

Tiger beetles are voracious predators which are characterized, in part, by their very agile habits (a fast gait and a readiness to fly) and their preference for dry, usually sandy, habitat. Most species are particularly active in hot, sunny conditions. Of the five British species, four closely conform to these characteristics, the exception being *Cicindela germanica* Linnaeus. Although this species has fully developed hind wings, it is apparently incapable of flight (I have never seen one fly nor have I heard of it doing so). When alarmed the beetle seems to rely entirely on running with great speed towards the nearest available corner (commonly fissures in the soil or clumps of ground vegetation). In addition, in Britain at least, it is usually associated with damp coastal habitat.

Distribution

In the British Isles this beetle is a rare and very local species, confined almost entirely to the coasts of south Isle of Wight, west Dorset and, at least formerly, Hampshire, south-east Devon and Dyfed. In addition there are old, unconfirmed, records for Berkshire, Kent and north-east Scotland. Since 1970 there have been records from two sites (three if Totland is included—see below) in the Isle of Wight and about four in Dorset. It has been categorized as a nationally rare species by Shirt (1987) and Hyman (1992). Confirmed records of this species have been published as a distribution map by Luff (1982); an updated provisional atlas of the British Carabidae is currently in preparation.

This species is very widely distributed throughout much of the Palaearctic, from Britain to eastern China; it is absent from both the far north of Europe and Asia (Horion, 1941). Throughout this range it is a local beetle, and in some localities is declining.

British records are summarized below. The following abbreviations have been used: BRC—record held by The Biological Records Centre, Monks Wood, Huntingdon; NHML—The Natural History Museum, London.

Berkshire. Basildon, near Pangbourne, Rev. C. S. Bird (Curtis, 1824).

Devon. Axmouth–Lyme Regis NNR, one, 6.viii.1968, M. G. Morris. Colyton, one, 28.vii.1944, G. H. Ashe (M. G. Morris coll.) (Colyton is well inland and is where Ashe lived in retirement; it is thus very likely that this specimen was collected somewhere nearby on the coast). Seaton, one, vi.1895 (Garde, 1906; Keys, 1918); landslip in some numbers, 20.viii.1944 (annotation in G. H. Ashe's copy of Fowler (1887), J. Cooter, pers. comm.); three, 17.vi.1947, A. A. Allen & G. H. Ashe; vii.1950, G. H. Ashe (BRC); landslip, 1961, P. J. M. Greenslade (BRC). The county (but no localities) is also listed by Fowler (1887) and Lindroth (1974).

Dorset. Bridport, 1897, H. Britten (BRC); one, 18.vii.1897, B. D. Cooke (D. G. Hemingway coll.); one, vii.1946, A. M. Massee (M. G. Morris coll.) (Bridport is inland, thus records attributed to this locality probably refer to Eype's Mouth or a coastal site close by). Charmouth, Dawson (1854); Pearce (1926); one, 13.vi.1928, C. E. Tottenham (NHML); "large colony on a fairly level and moist clearing [on

blue clay] in the scrub on the top of the cliff some three-quarters of a mile east of the point where the lane from the village comes down to the shore'', 20.vi.1936 (Daltry, 1949); one, 17.vii.1952, J. Cowley (NHML). Charmouth–Lyme Regis landslip, small numbers at one restricted site at the eastern end of The Spittles (adjacent to and above the beach) almost annually between 1981 and at least 1986, G. R. Else. Chideock (probably Seatown), 30.vii.1989, A. Duff (BRC). Seatown, near Chideock, one, 3.vii.1981 and another on 6.vii.1991, both G. R. Else; in abundance on sun-baked, exposed soil high up on an unstable cliff a short way to the east of Seatown, viii.1992, D. G. Hemingway. Eype, 24.vii.1980, P. Hodge (BRC); 4.vi.1989, D. A. Lott (BRC). Eype's Mouth, numerous larvae, 30.ix.1964, M. Luff (pers. comm.); vii.1969, R. Crossley (BRC); 3.vi.1989, M. Collier & H. Mendel (BRC); adults, many larvae and a pupa, 1.vi.1992, J. A. Owen (pers. comm.). Near Great Ebb, Thorncombe Beacon (c 1 km west of Eype's Mouth), three on damp, broken undercliff, 1.viii.1992, S. P. M. Roberts; the species has also been found here recently on several occasions by J. Cooter. Golden Cap–St. Gabriel's Mouth area (cliff terrace), a few, 17.vi.1992, J. Cooter. Lyme Regis, ix.1833, F. Walker (Walker, 1833), and one, 2.viii.1951, D. Tozer (NHML); 1957, D. Tozer (BRC). Swanage, Dawson (1854 [as Swanwich]); 1894, E. C. Rye (BRC); one labelled ''Swanage. E.A.W.'' (presumably Waterhouse) (H. W. Ellis collection in The Yorkshire Museum, York (M. L. Denton, pers. comm.)) E. A. Waterhouse (in Fowler & Donisthorpe, 1913).

Dyfed. Llanstephen, one, 2.viii.1954, B. Sage (Sage, 1955) (the specimen survives in Sage's collection (identification confirmed)). This locality is a coastal site which, according to I. Morgan (pers. comm.), consists of south-facing Old Red Sandstone cliffs with some freshwater seepages.

Grampian. Inverey, near Braemar, two running amongst stones by the Dee, apparently in v.1953, A. M. Robertson (Robertson, 1954). This unconfirmed and very dubious record may have been based on misidentified *Cicindela campestris* Linnaeus or perhaps either *Asaphidion pallipes* (Duftschmid) or an *Elaphrus* species.

Hampshire. Barton-on-Sea, ''rare'', 1928 and 1930, A. Ford (B. M. Hobby in Fraser, 1949); four, 24.vi.1948, ''HWF'' (A. Sculthorpe collection, NHML). Five, 20.vi and 30.vi.1948, Fraser (1949) at a locality, not specified, opposite the Isle of Wight (he also refers to a Dr Basker who obtained specimens near this locality, but the name of the latter is again not quoted and neither is the date of collection): it is possible that this site refers to Barton-on-Sea.

Isle of Wight. Blackgang and Blackgang Chine, Chale. These two localities are so close to one another that they are treated here as a single site, Blackgang (the Chine is less than 0.5 km from Blackgang itself). Most, if not all, of the many ''Blackgang'' records probably come from the foot of the Chine. This is one of the best known localities for the species in Britain and one from which it has long been known to occur (e.g. Curtis, 1824; Fowler, 1887). Indeed, Curtis's record (first edition, omitted from the second) of a specimen collected here in vii.1810 by a Mr Brightwell, is apparently the first reference to this species' occurrence in Britain. Other records of the beetle from this site include eight, 5.vii.1894 and four, 13.viii.1903, H. Donisthorpe (NHML); four, 24.viii.1908, H. Dollman (NHML); eight, 19.vi.1928, C. E. Tottenham (NHML); common, 23.vi.1928, P. Harwood (A. A. Allen, pers. comm.); one, 26.ix.1968, M. Chambers and G. R. Else; at least 15, 28.vii.1977, D. M. Appleton and G. R. Else; several, 1.vii.1980, G. R. Else. There are numerous other records from Blackgang which are held by the Biological Records Centre, Monks Wood (M. Telfer, pers. comm.). Chale (this locality is probably synonymous with Chale

Chine (near Blackgang Chine) (the village of Chale being inland)), 16 (no date), G. C. Champion (NHML); one, 7.vii.1917, C. T. Gimingham (M. G. Morris coll.); several larvae in their burrows, K. G. Blair (Blair, 1920). Ladder Chine (adjacent to Whale Chine), 1947, F. D. Buck (BRC). Ryde, Rudd, 1837 (Fowler & Donisthorpe, 1913). Shanklin, one, v.1921, C. E. Stott (M. G. Morris coll.). Totland Bay, probable larvae of this species on the landslip, 8.v.1988 and 15.v.1989, J. A. Owen (pers. comm.). Whale Chine, 16.vi.1990, A. P. Fowles (BRC). Whale Chine east to Ladder Chine (about 2.5 km north-west of Blackgang), one, landslip, 1.vii.1980, G. R. Else; in great abundance in the same area, 28.vi.1990, G. R. Else, J. Ismay and C. O'Toole.

Kent. Dartford (Curtis, 1824). Darenth Wood (Fowler, 1887).

Habitat preferences

The five British species of *Cicindela* exhibit strong habitat preferences. *C. maritima* Lat. & Dej. and *C. hybrida* L., which are mainly confined to western Britain, are inhabitants of dry, coastal duneland; *C. sylvatica* L. is particularly associated with sandy, inland heaths in southern England; and *C. campestris* L., which is found throughout the British Isles, is mainly encountered on sandy soils in various biotopes, including heaths, moors, open deciduous woodland and the coast. In contrast, *C. germanica* is usually associated with sparsely vegetated soils in the vicinity of freshwater seepages on coastal landslips (*C. campestris* has also been found in the same habitat as that favoured by *C. germanica* in Dorset, but there it is very scarce).

Lindroth (1974) in his handbook to the British Carabidae describes the habitat of *C. germanica* as "open grassland near the coast". This description is inaccurate and misleading as it could, for example, imply calcareous downland just inland of the coast. On several occasions in the 1970s, D. M. Appleton and I searched for the species in grassy scrubland on the higher terraces of the Blackgang landslip, Isle of Wight, without encountering a specimen. Newbery (in Morey, 1909) is more accurate when he states "foot of cliffs amongst coarse grass". All Blackgang specimens found by D. M. Appleton and me were eventually found running over freshwater seepages, consisting of areas of wet mud on the lowest cliff terrace or at the base of the cliffs. Typically, sparse vegetation predominated in these sites, often with quantities of reed (*Phragmites australis* (Cav.)). In all other sites in which I have found the beetle on the Isle of Wight and in Dorset the habitat also consisted of freshwater flushes near the bases of cliffs or on steep slopes. Some of these sites were extremely limited in extent. For example, on the Charmouth–Lyme Regis landslip, Dorset, I found the species on an expanse of open, wet clay adjacent to a small reedbed. Similar habitat existed elsewhere on the landslip but the beetle was never observed there, despite several searches. At Chideock, my 1991 specimen was found in another very discrete area: a wet, muddy slope near the cliff edge. The slope was surrounded on the inland side by dense scrub. At Seaton, Devon, A. A. Allen (pers. comm.) found the beetles on the lower part of the landslip, where they ran on sandy silt beside a small stream or seepage. However, on the Hampshire coast, Fraser (1949) found his specimens in very dry, gravelly situations; some other records refer to the species occurring on sun-baked soils. The gradual, continual slumping of the interbedded clays, sandstones and limestones of the landslips which are such a feature of the species' preferred biotope in Dorset and on the Isle of Wight, is responsible for maintaining a constant supply of exposed, often waterlogged, soil. Such areas may eventually dry out, become overgrown with vegetation, and hence lose their attraction to the beetle.

On the European mainland this species is not dependent on any special habitat requirements; for example, it occurs on the coast, heaths, natural grassland (steppes), chalk, and along moist woodland edges (Koch, 1989).

Biological observations

Very little seems to be known about the biology of this species. The predatory larvae of *C. germanica* have been located in Britain, at Blackgang, Isle of Wight, in early May, 1920 (Blair 1920) and at Eype's Mouth, Dorset (larval burrows found plentifully in damp sand or mud by M. Luff and J. A. Owen (pers. comm.) and, although larvae were collected by both, none were reared). On 1.vi.1992 Owen found as many as 20 larval burrows to the square metre in places. Donisthorpe (1906) states that on the Isle of Wight the larval burrows are covered completely by the sea when the tide is very high. This is probably exceptional, as in many sites I have visited (both on the Island and elsewhere) the species occurs on ground well above the high water mark. The fully grown larva is briefly described by Blair (1920). The adults are active from mid-May to September; callow specimens have been unearthed in early May (J. Cooter, pers. comm.). Prey capture by larvae or adults has rarely, if ever, been witnessed (according to Blair (1920), the larvae that he found had fed mainly on ants).

I have collected specimens of the very local tiphiid wasp *Methocha ichneumonoides* Latr. in the same habitat as that for *C. germanica* in the Isle of Wight and Dorset. The apterous female of this wasp seeks out (as food for its offspring) *Cicindela* larvae of several species which it paralyses, by stinging, in their burrows. For further details of its biology see Champion & Champion (1914). In these coastal sites the wasp is appreciably smaller than most specimens found in areas inhabited by the other, larger *Cicindela* species. It is therefore possible that *C. germanica* is the main host of this wasp when the latter is found in this beetle's few coastal localities.

Acknowledgements

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BOOK REVIEW

Biology of insect-induced galls edited by J. D. Shorthouse and O. Rohfritsch. Oxford University Press, New York & Oxford, 1992, ISBN 0-19-506716-9, x + 285 pages, hardback, £65.—This wide-ranging and stimulating volume brings together contributions from many of the leading researchers in the field of cecidology. The editors have allowed different approaches from their authors, according to the topics concerned, and in the opinion of the reviewer this makes for a much more lively and interesting book than a series of literature reviews with a similar structure and style. There is insufficient space here to discuss (or even list!) the contents of each of the 17 chapters. Suffice it to say that many aspects of insect-induced galls are considered in depth and with the results of some of the latest investigations included and placed in context. With such a broad subject, individual readers will find different chapters of greater or lesser interest, but any entomologist or cecidologist will find much to inspire as well as many sections to refer to in future. I particularly enjoyed chapter 3 'Evolution of the gall-inducing guild', chapter 4 'Fossil galls', chapter 14 'Evolution and ecology of gall-inducing sawflies' and chapter 15 'Ecology of *Pemphigus* gall aphids', but I found a great deal of interest in the other chapters as well. Gall-inducing insects are fascinating to study, for both professional biologists and amateur naturalists, offering many opportunities for original investigations. For instance, the life-histories and natural enemies of many gall-inducing insects remain unknown, and with the growth of the British Plant Gall Society it is now easier to contact others with similar interests. This is an expensive book, but if you are interested in the subject it is strongly recommended as being good value and the best treatment of its kind available. The forthcoming volume on plant galls in the Naturalists' Handbooks series (to be reviewed in this Journal) will be much cheaper and directed more towards the amateur naturalist in Britain; those with restricted budgets for book purchases might wish to wait for this latter book to appear.

I. F. G. McLean

BENHS INDOOR MEETINGS

28 April 1992

Mr R. A. JONES showed a selection of beetles and bugs all of which were equipped to greater or lesser degree with either thorns or horns. In particular, two males of the minotaur beetle, *Typhaeus typhoeus* L. (Coleoptera: Scarabaeidae) showed the great range in size and shape that horns can achieve even within a single species. A larger specimen had great sculpted prongs, projecting well beyond the head, whereas the smaller specimen had delicate points reaching only half way over the head.

Mr A. J. HALSTEAD showed a female specimen of *Nebria brevicollis* (F.) (Coleoptera: Carabidae), found with several others by the river Coiltie near Urquart Bay on Loch Ness, East Inverness-shire on 14.vii.91. Its right elytron had a reddish area towards the apex where the normal black coloration had not developed.

Mr M. J. SIMMONS showed a specimen of *Noctua comes* (Hübn.) ab. *sagittifer* (Cockayne), taken at light at Crowborough, East Sussex on the night of 13.ix.91. This form differs from the norm in that it has prominent cross-lines running from the costa to the dorsum of the fore wings. The postmedian fascia in the specimen has a dentate pattern. The aberration is common on the Isles of Scilly, but rare on the mainland.

The name of Dr A. J. A. Stewart was read for the second time and he was duly elected a member of the Society.

The President, Dr J. MUGGLETON reported that he had visited Dinton Pastures on the previous Thursday to attend one of the regular site meetings. The concrete base of the building had been laid, the steel framework was erected and the bricks of the walls were laid up to about one-third in height.

It was reported that Mr Gaston Prior had suffered a second stroke. Although unable to travel to meetings, he wished to be remembered to his friends and colleagues in the Society.

Mr R. A. JONES then spoke on 'Fantastic forms—a quizzical look at insect structure'. Insects are all shapes and sizes and their bodies show diverse and fascinating structures under the lens. Many of these forms have developed in response to particular evolutionary pressures. Colour and body shape conspire to effect camouflage, crypsis, mimicry and warning. Legs have developed along different lines to produce swift runners, slow powerful diggers and various means of swimming.

Beetles have developed hard wing-cases, presumably in response to the great advantage of being able to push through undergrowth, hide under stones and burrow, without suffering damage to their delicate flight wings.

Despite this constraint, beetles have evolved strange and wondrous forms. Many of these forms can be attributed to the function of the various body parts in the beetle's behaviour or living habits. Many that burrow in wood or in the earth are practically cylindrical; many that live under bark are flattened; many that push through the undergrowth are wedge-shaped, and many that live under stones have shortened elytra, perhaps giving them greater flexibility in confined spaces. What then are we to make of the prickly *Hispa* beetle?

Various structures in beetles are ill-understood, such as the spiny prominences at the apex of certain bark-beetle elytra. The lecturer wondered whether these were for recognition or defence in the tight confines of a tunnel where the beetle could not turn about to meet another coming up behind, be it of the same species or an attacker.

Horns, especially if only occurring in the male of the species, have often been argued to be the result of sexual selection—the larger horns being borne by the strongest and therefore the fittest individuals. Some are used for fighting, usually between males, over females. Not all fights use jaws or horns, a bizarre tortoise beetle had the shoulders

of its wing cases produced into points, which met similar points on the rear corners of the thorax. By using point against point, like tweezers, one male could grasp another and turn it off of the herbage thereby winning its mate.

Examination of insect form, with regard to insect behaviour and lifestyle shows some obvious evolutionary traits, but others remain to be determined, or their structure explained by other means.

12 May 1992

Mr A. J. Halstead showed a flowering shoot of cultivated heather (*Erica* sp.) which had two pupal cases of the coleophorid moth, *Coleophora pyrrhulipennella* Zell. attached to the shoot tip. The specimen was sent to the exhibitor from a garden in Woking, Surrey, on 3.v.92.

The main business of the meeting centred around a discussion on invertebrate conservation. The discussion was preceded by some introductory statements. Helen Smith described how the Joint Committee for the Conservation of British Invertebrates had evolved from a conservation committee set up by the Royal Entomological Society in 1925. She described the current status and activities of the JCCBI and how the organization might develop in the future. Steven Brooks, who is the JCCBI representative on Wildlife Link, described how this body, which is formed from various wildlife interests, meets to discuss conservation policy matters and respond to proposals put forward by government departments and others. Steven Miles circulated a paper which outlined some of the major discussion points on invertebrate conservation and how this can be most effectively achieved.

The discussion, which will be written up and published in the journal, covered a wide range of topics, including the role of various organizations in conservation; the need to record the invertebrate interest of sites other than those already well worked and to pass on the information to other organizations who can make use of the data; the need to recognize good sites by the assemblage of habitat types and their associated invertebrates, rather than simply listing species. Conservation should be aimed at conserving habitats rather than specific insects—site owners need advice on this, since the needs of invertebrates are often very different to those of plants or birds. There were mixed opinions on the effectiveness of the JCCBI. Some felt it was not making itself sufficiently well known although it was recognized that it needed more secure funding so it could appoint a full time conservation officer. The need to collect insects needs to be explained and justified, particularly now the British Butterfly Conservation Society, with its anti-collecting stance, is rapidly expanding its membership and influence, and is assuming the role of the leading insect conservation organization in the eyes of the public.

9 June 1992

Mr A. J. Halstead exhibited live insects, namely: a longhorn beetle *Phymatodes testaceus* (L.) (Coleoptera: Cerambycidae) found hiding in a bark crevice on the trunk of a moribund oak; a sawfly *Macrophya montana* (Scop.) (Hymenoptera: Tenthredinidae) a female found on the flower head of ground elder, this species has larvae which feed on the leaves of *Rubus* species; both of the preceding insects were collected on 9.vi.1992 at the Royal Horticultural Society Garden, Wisley, Surrey. He also showed larvae of the rose slugworm sawfly *Endelomyia aethiops* (F.) (Hymenoptera: Tenthredinidae) which is a widespread pest of wild and garden roses and has two generations during the summer. The larvae feed mainly on the upper leaf surfaces, grazing away the tissues but leaving the veins and lower epidermis intact.

The damaged areas dry up, becoming whitish-brown and creating a window pane effect on the foliage. The second generation of larvae in late July–August is usually more numerous than the first generation in May–June. Then Mr Halstead showed a male *Conops vesicularis* L. (Diptera: Conopidae) found on 16.v.1992 during the field meeting at Witley Common, Surrey. The specimen had been killed by a spider, believed to be *Misumena vatia* (Clerck). The fly had been seized by the head as it attempted to visit the hawthorn blossom on which the spider was sitting. Conopid flies have larvae that develop as internal parasitoids in adult bees and wasps. *C. vesicularis* is an uncommon species and is associated with the bumblebee *Bombus muscorum* (L.).

Mr R. McCormick exhibited *Egira conspicillaris* L., (Lepidoptera: Noctuidae) the silver cloud, bred from egg batches taken in Herefordshire. The larvae had been fed entirely on broad-leaved dock *Rumex obtusifolius* L. and had a tendency to eat each other, especially in the smaller instars. Given sufficient space and regular feeding, losses are not too great after the initial casualties.

Mr I. Brydon showed a spider, *Herpyllus blackwalli* (Thorell) (Araneae: Gnaphosidae) the 'mouse spider', which was found on a towel by a lady in High Halstow, North Kent. It bit her and the pain was said to be 'worse than a wasp sting'.

At the conclusion of the meeting Mr R. W. J. Uffen exhibited live larvae of *Yponomeuta* sp. (Lepidoptera: Yponomeutidae) on willow, found at Roydon, Essex on 6.vi.1992. He also showed the scarce fly *Nephrocerus flavicornis* Zett. (Diptera: Pipunculidae) from Belhus Wood, Essex 6.vi.1992; the ground hopper *Tetrix undulata* (Sowerby) (Acridoidea: Tetrigidae) found on 6.v.1992 at Arbrook Common, Surrey from which the fly *Leiophora innoxia* (Meig.) (Diptera: Tachinidae) had emerged on 25.v.1992. He also showed two moths, namely *Coleophora alnifoliae* Barasch (Lepidoptera: Coleophoridae) found on grey alder *Alnus incana* Moench at Black Park, Iver, Bucks., on 1.vi.1992, and *Coleophora frischella* (L.) (Lepidoptera: Coleophoridae) a colony at Nomansland Common, Wheathampstead, Herts., on white clover *Trifolium repens* L., on 5.vi.1992. At the last locality the local fly *Symphoromyia immaculata* (Meig.) (Diptera: Rhagionidae), usually associated with chalk and limestone grassland, was very common.

Mr P. J. Chandler announced that the building at Dinton Pastures had been delayed during roof construction and the projected completion date was now the first week of August (five weeks late). There had been delays with the delivery of the windows as the manufacturer had gone out of business. The heating and ventilation units had now been installed in the roof.

Dr I. F. G. McLean remarked on the abundance of brimstone butterflies, *Gonepteryx rhamni* L. this year. A small, isolated buckthorn bush in the garden at Brampton, Huntingdon had several eggs laid on leaves at the tips of the branches.

Mr I. D. Ferguson reported seeing small tortoiseshell *Aglais urticae* L. and brimstone in abundance this year.

Mr I. Brydon had seen a pale clouded yellow (which species could not be confirmed) and three painted ladies *Vanessa cardui* L. on 27.v.1992 at St Mary's Bay on the North Kent coast.

The lecture was given by Dr A. G. Irwin of the Norwich Castle Museum, Norfolk, entitled 'Christmas quokkas—a personal view of Australian natural history'.

Last year the Irwin family, Tony and Tricia, with children Amy (11), Ben (9) and Sam (1) decided to go for a Christmas holiday rather than take the usual summer break. The choice of Western Australia proved a happy one with the chance of combining some time on the beach (here relaxation was helped by excellent Champagne at only the equivalent of £1.50 per bottle!) with natural history, including collecting

Ephydridae (shore flies), Tony Irwin's speciality. They hired a camper van, which was enjoyed by the children, and the combined toilet/shower cubicle provided a space to pin out flies—at the cost of occasional cramp!

Splendid slides gave the audience an introduction to the wonderfully varied landscapes and wildlife of a part of Australia which has a considerable endemic flora and other wildlife. Many of the plants had an exotic appearance, with large bright flowers, while others looked as though they had been assembled from British plants, with the stems, leaves and flowers interchanged between species. Diverse coastal areas were the setting for spiky *Spinifex* grasses on dunes (lethal for sweep nets) as well as extraordinary stromatolites on a beach; these closely resemble some of the oldest known fossils which are 3½ thousand million years old. Limestone and ancient red sandstone headlands contrasted with massive granite monoliths ('elephant rocks') as backdrops to the beaches.

They chartered a light aircraft to explore the coast far north of Perth, on the way seeing cliffs and other coastal features with no sign of people. At Shark Bay they saw dugongs, which inhabit extensive sea grass beds. Here there is a major salt extraction industry which exports 700,000 tons of salt per year to Japan. Other principal economic activities in the State are agriculture, mining and forestry.

Much of the native flora has been displaced by grazing, though the remaining forest areas include some massive deciduous trees up to 90 m tall. Large mammals are difficult to see, excepting the kangaroos, with the occasional squashed possums or mouse on the road the only evidence of other indigenous species. The Irwin River (named after a previous explorer!) was extensively dried out at this summer season, with tadpoles in the river puddles and many large spider-hunting wasps.

With the temperature reaching 40°C and a hot wind from the Indian Ocean daytime activity had to be restricted to avoid exhaustion. While the main season for wild flowers was over, the slides shown gave a good impression of the variety of the flora. Cicadas were plentiful, noticeable from their singing, but other insects were not so friendly—Ben was bitten or stung over 30 times by six different species! He was not the only one to argue with the local wildlife; Tony was ambushed by an aggressive male western grey kangaroo at a campsite, and only escaped a potentially dangerous assault through swinging a loaded rotary washing line in the way to confuse the animal.

The quokkas, in the title of the talk, are small wallabies. Over 10,000 live on an island near Perth, where they have no fear of humans and are even a nuisance at times. Along with National Parks and other attractive areas, the quokkas are doing their bit to help establish a growing tourist industry in Western Australia. The questions at the end of the talk reflected the considerable interest Tony Irwin had raised in the audience for this faraway wildlife haven, and he gave some tips on how to make the most of the opportunity of a visit should the chance arise for others.

14 July 1992

The President, Dr J. MUGGLETON, showed an adult female and egg case of the small mantid *Ameles spallanziana* (Rossi) (Dictyoptera: Mantidae) found in desert habitat at Tabernas, Almeria, southern Spain in mid-June. Specimens were also found in an abandoned vineyard near Ocana, 60 km south of Madrid. Green and brown females were found, and they have much reduced wings and a distended abdomen. The males are thin, winged and fly freely. The species is said not to be cannibalistic, however, in captivity this female ate a male and another female of the same species.

Mr A. J. HALSTEAD exhibited two live individuals of *Melanophila acuminata* (Deg.) (Coleoptera: Buprestidae). This uncommon beetle was found on Chobham

Common, Surrey on 12.vii.1992. One was taken by sweeping vegetation near a piece of burnt heathland; the other was found on the fire-blackened trunk of a silver birch nearby. The species is local in the south of England. It is particularly associated with burnt areas as the larvae develop under the bark of fire-damaged conifers and birch.

The names of Richard Lewington, Paul Markey and Mark Taylor were read for the second time and they were duly elected members.

Mr P. J. CHANDLER announced that the building at Dinton Pastures was due for completion on 7 August 1992. The Librarian Mr S. R. MILES requested help with moving books into the new building in the latter part of August.

Mr A. J. HALSTEAD had seen eight red admiral butterflies *Vanessa atalanta* (L.) on an oak with sap runs at Wisley Garden, Surrey on 7.vii.1992. There were interactions between the butterflies and aggressive wasps also seeking refreshment. Dr I. F. G. McLEAN reported seeing on 13.vi.1992 a single clouded yellow *Colias croceus* (Geoffroy *in* Fourcroy) fly across the road in front of his car just south of Saltburn on the Yorkshire coast. He had also seen a painted lady *Cynthia cardui* (L.) at Wicken Fen, Cambridgeshire on 2.vii.1992. Dr J. Muggleton observed that during the evening after the ordinary meeting on 13.v.1992 several lepidopterists had remarked that it looked like a good night for migrants. The next day he had been pleased to find in his light trap *Heliothis peltigera* (D. & S.) and several *Autographa gamma* (L.). Mr T. JAMES reported that Mr John Tomkins (a non-member) had found a female scarce swallowtail *Iphiclides podalirius* (Scop.) on 14.vi.1992 laying eggs on a garden *Prunus* at Langley, near Hitchin, Hertfordshire.

The lecture was given by SARAH LAMBERT of Peterborough on 'The changing flora of Cambridgeshire'. She began by saying that Cambridgeshire is still an interesting county botanically, though there have been considerable changes since the time of John Ray who published an account of the flora in 1660. She then outlined the scope of her talk, indicating that the vice-county was the principal area to be covered, with brief excursions into Huntingdonshire, Northamptonshire and the Soke of Peterborough. The reasons for past changes in the flora as well as future opportunities for plants were important themes through the talk. After an introduction to the geology and topography, which is more varied than the first impression of a flat, arable county might suggest, the continental climate was referred to as an important factor influencing the composition of the flora. There is a general absence of western species, for example, even red campion, *Silene dioica* (L.) Clairv., is a rarity, probably due to the low rainfall. There are distinctive specialities such as the oxlip, *Primula elatior* (L.) Hill, which is frequent within ancient woods in the county. There are also northern elements present, such as purple milk vetch, *Astragalus danicus* Retz., contrasting with yellow vetchling, *Lathyrus aphaca* L., a southern species, which in Cambridgeshire is at the northern edge of its range in Britain.

The main habitats for plants were described with the aid of some fine colour slides, starting with evocative pictures of the fens under a variety of skyscapes at different seasons. The long history of drainage has inevitably caused substantial losses and declines of fen plants such as saw sedge *Cladium mariscus* (L.) Pohl (formerly widespread and now scarce outside Wicken and Chippenham fens), traditionally cut every four years for thatching material. Fen 'litter' is cut annually, with marsh pea, *Lathyrus palustris* L., and lousewort, *Pedicularis sylvatica* L., being two very restricted species characteristically associated with these conditions. The fen violet, *Viola persicifolia* Schreber, has made a welcome reappearance at Wicken and Woodwalton fens after the clearance of carr. Within the fen meadows, once widespread where the fens met chalk slopes, meadow rue, *Thalictrum flavum* L., and columbine, *Aquilegia vulgaris* L., are of interest, as is the rare Cambridge milk parsley, *Selinum*

carvifolia (L.) L., first discovered in 1882. This was rumoured to have been introduced but is now thought to be native; currently the populations are stable. The bogs have all gone, for instance, formerly sundews were found on areas of impeded drainage at places such as Wicken, Chippenham and Woodwalton fens, at Gamlingay, Fowlmere, and near Cambridge. The round-leaved sundew, *Drosera rotundifolia* L., was last seen at Chippenham Fen in 1913.

The demise of humid heath habitat, characterized by cross-leaved heath, *Erica tetralix* L., resulted in the loss of a number of species including bog asphodel, *Narthecium ossifragum* (L.) Hudson. Along the lodes and dykes there are good localities for aquatic plants. The Old Bedford River, or River Delph, is richest for water plants, with white and yellow water lilies, *Nymphaea alba* L. and *Nuphar lutea* (L.) Sm. and the fringed water lily, *Nymphoides peltata* (S. G. Gmel.) O. Kuntze, present. The lovely flowering rush, *Butomus umbellatus* L., occurs along the banks of the better rivers while out in the channels arrowhead, *Sagittaria sagittifolia* L., is found. Ditch plants have declined more than river species, the best remaining places being along the 'Washes' where frogbit, *Hydrocharis morsus-ranae* L., water violet, *Hottonia palustris* L., and the bladderworts, *Utricularia* spp., are still found, while the arable fens are generally poor in ditch species. Gravel pits have been colonized by some interesting plants, particularly near the better existing habitats; generally the water quality is good. Reed sweet-grass, *Glyceria maxima* (Hartm.) Holmb., has increased however, due to increased levels of nitrogen in many areas. For example, where formerly ditch clearance took place every eight years, annual removal may now be needed.

The account of grasslands highlighted important examples in the old county of Huntingdonshire, with green-winged orchid, *Orchis morio* L., on drier meadows and fritillary, *Fritillaria meleagris* L., on the flood meadow at Port Holme, which is a Lammas Meadow. Here the hay is cut in strips owned by different people, with common grazing by sheep and cattle over the whole meadow after Lammas day (1 August). Calcareous grasslands are represented by some fine examples, including Barnack Hills and Holes, Devil's Ditch near Newmarket and the adjacent Newmarket Heath where the Breckland rarity spiked speedwell, *Veronica spicata* L., grows on patterned ground (a periglacial feature). Bloody cranesbill, *Geranium sanguineum* L., still grows on a stretch of the Devil's Ditch where it was recorded by Ray 330 years ago! Acid grasslands are scarce, with their typical plants such as beautiful St John's wort, *Hypericum pulchrum* L., known from few places, in the case of this species only from Gamlingay.

Cambridgeshire is the least wooded county in Britain. Most woods were cleared prior to the medieval period, but those that remain are rich. Coppice with oak, ash, field maple and hazel is characteristic, and midland hawthorn is frequent. Most woods are neglected or managed for game; the audience enjoyed some fine slides of the typical herbs, some of which have declined due to the abandonment of coppicing. The lecture concluded with an account of the arable weeds. One example deserving special mention is grass-poly, *Lythrum hyssopifolia* L., first recorded by Ray in 1660 and re-found in 1958 near Thriplow in seasonally flooded wet hollows, which are periglacial in origin (these are termed 'pingos'). Grass-poly occurs in company with the fairy shrimp *Chirocephalus* and has been sporadic since the onset of the recent drought.

Questions from the audience included examination of the role of SSSIs in protecting plants and other wildlife, with the need for positive management being emphasized. The role of local authorities in identifying and protecting sites of local interest was discussed, and the effects of new road schemes in damaging SSSIs and other important areas were agreed to be very detrimental. The project which aims to produce a new

flora for the county was mentioned, this will give an up-to-date assessment of the vascular plants to compare with the historical accounts.

8 September 1992

Joint Meeting with the London Natural History Society

The President, Dr J. MUGGLETON, showed what was at first thought to be a species of *Steatoda* (Arachnida: Theridiidae) which was frequent under stones in a desert environment, Tabernas, Almeria, southern Spain. It was subsequently shown to be a *Latrodectus*, a black widow spider. Some *Latrodectus* and *Steatoda* species may be dangerous to man but the effects of *Steatoda* bites are less well documented than for *Latrodectus*.

Mr R. A. JONES showed a specimen of *Mordellistena acuticollis* Schilsky (Coleoptera: Mordellidae) taken at Eriswell Lode, Mildenhall, Suffolk, 14.viii.1983, by sweeping, the third British specimen. This species was previously confused with *M. parvula* (Gyll.) until a revision of this group in 1986. He also showed specimens of *Bembidion octomaculatum* (Goeze) (Coleoptera: Carabidae) from Powdermill Reservoir, near Brede, East Sussex, 23.vi.1992, running amongst the waterside vegetation. This is the first 20th-century record for the species which was last taken in Surrey in 1875 and the Isle of Wight in 1887.

Mr A. J. HALSTEAD showed two caterpillars. The first was that of the sycamore moth *Acronicta aceris* (L.), from a garden at Cheam, Surrey. The second was that of the privet hawk moth *Sphinx ligustri* L., from a garden at Wood Dalling, near Norwich, Norfolk, said to have been feeding on the shrub *Spiraea* × *arguta* Zabel—a plant of the Rosaceae family.

The President announced that the BENHS's new headquarters at Dinton Pastures was complete; the library had been moved in by the Librarian and other volunteers, and the inaugural field meeting was scheduled for 20 September.

Mr A. J. HALSTEAD reported that in his office at RHS Garden, Wisley, he had observed a small tortoiseshell, which had been adopting a hibernating posture since mid-July. He also reported that larvae of the elephant hawk moth appeared to be having a good year.

The lecture, entitled 'The ecology of the high-brown fritillary—Britain's most endangered butterfly?' was given by Dr Martin Warren. The high-brown fritillary, *Argynnis adippe* (D. & S.), used to be quite common in woods in southern Britain, but since the 1950s it has declined precipitously, until it has become one of the country's rarest butterflies. The insect has been recorded from over 500 10-km squares, but since 1980 it is known from only 30, a decline of 94%. Today, there are three main bands of colonies: Herefordshire with 4 or 5 colonies, the southern Lake District with 15 to 20 colonies and the fringes of Dartmoor and Exmoor with about 20 colonies.

Oviposition is a lengthy procedure, with much probing, even though only a few eggs are laid. The egg is the overwintering stage, and positioning is very important. The most commonly chosen site is on a twig or piece of dried bracken, firm substrates that will not rot. The larvae hatch the following March and feed in the day time when it is warm enough. They are full grown by mid-May, pupate in May and June and begin to emerge in mid-July.

Despite initial doubts about experimental viability, marking studies gave good recapture rates, implying low population numbers. The butterfly is a very mobile species (when it wants to be), but these same marking studies showed that it was closely faithful to the very small areas in which it breeds.

The most important breeding sites turn out to be dense bracken stands, not sites entomologists would ordinarily expect to be worthwhile. It was suggested that

three-quarters of all the remaining British sites relied on violets growing under dead bracken. Another major habitat was thin layers of moss growing on rock outcrops in the southern Lakes where early morning temperature rose rapidly on sunny spring mornings allowing the newly-hatched caterpillars to feed.

The decline of the butterfly was blamed on changing land management. Coppicing had all but disappeared, commons and rough pastures were no longer grazed and where once bracken was trampled by animals, allowing in more light, it now stood in stands too dense for violets to grow. Where previously bracken litter was collected for animal bedding, it now lay in mats three feet thick, undecomposed and stifling to other plants.

In an attempt to simulate grazing, various ways of cutting back the bracken were tested on various plots of common land. These included cutting and raking the bracken, clearing with a mechanical flail and simple trampling down of narrow tracks through the bracken. The last method seemed to offer some success, butterflies observed flying over the tracks would drop down into the small cleared areas to lay eggs.

Experimental coppicing offered mixed hope. After one year a clearing might be a sea of violets, but by the next, succession would have changed the site so dramatically as to be now unsuitable. Areas of rocky outcrop within the test coppice sites still proved attractive to the butterflies, probably because of the much warmer microhabitat of the moss-covered rock.

Because of the butterfly's disturbing decline, it is regarded as our most endangered species, and may soon be added to the Schedule 5 list of protected species. However, many of the remaining sites are owned by conservation bodies or are notified as SSSIs. Now that the close association with bracken has been recognized, management plans can be implemented with the realization that bracken is not the invasive pest it was once thought to be. In fact the proposal that bracken should be controlled by the importation of a South African moth was looked upon with suspicion. There is always the possibility that such moths might reduce the bracken on the very sites on which the butterflies occur. At least cutting and spraying could be confined to limited areas, a biological control organism, once released cannot be stopped.

On an optimistic note, Dr Warren concluded that initial signs of the butterfly's recovery were promising. Many conservation bodies were involved in studying and conserving it, and the overall picture was that its distribution was becoming increasingly stable. With good management, it was hoped that the trends could be reversed.

BENHS FIELD MEETINGS

Richmond Park, 6 June 1992

Day meeting. Leader: **Stephen Miles**. After a wet start the conditions gradually dried out with sunny periods. The party split into two groups, the three professionals heading for the more well-known over-mature tree areas in the middle of the park. The leader and one other member opted to explore the western slopes first. Here Ray Softly encountered the following microlepidoptera: *Aleimma loeflingiana* (L.), *Pammene regiana* (Zell.), *Crambus lathoniellus* (Zinck.) and several *Myelois cribrella* (Hübn.). The larvae of *Pleuroptya ruralis* (Scop.) were also found in rolled nettle leaves. Ray also secured a larva of the rose chafer beetle *Cetonia aurata* (L.). A specimen of the dead-wood-nesting sphecid *Crossocerus cetratus* (Shuckard) was found by the leader on a large old oak branch lying on the ground.

The most interesting species found by Roger Key and colleagues was a larva of the RDB2 beetle *Ampedus cardinalis* (Schioedte) in the areas just east of Pembroke Lodge. The hornet *Vespa crabro L.*, both a queen and one worker were also seen,

as were specimens of the ant *Lasius brunneus* (Latr.). In the afternoon some old trees south of Pen Ponds were explored and the more interesting beetles found were *Notolaemus unifasciatus* (Latr.) and *Tomoxia bucephala* Costa, this latter species was abundant on fallen oak and beech. A specimen of the solitary wasp genus *Trypoxylon* was seen apparently 'fighting off' a chrysidid wasp, these were later identified as *Trypoxylon clavicerum* Lep. and *Trichrysis cyanea* (L.).

The leader and two other members opted to cover the areas surrounding Pen Ponds. The small moths taken here were *Epichnopteryx plumella* (D. & S.), *Eucosma cana* (Haw.) and *Bactra lancealana* (Hübn.). A single female specimen of the pompilid wasp *Dipogon subintermedius* (Magretti) was taken at rest on a living tree bole. The most surprising catch taken by the leader was a male specimen of the solitary bee species *Andrena labialis* (Kirby). In my experience this is most often found on coastal landslips and in old sandpits. On the up-turned root-plate of an old debarked poplar tree, a specimen of the uncommon crabronid wasp *Crabro scutellatus* (Scheven) was also found. Peter Chandler was pleased to observe a specimen of the small otitid fly *Myennis octopunctata* (Coquebert) mimicking zebra spiders on the fallen bole of this same tree, however, he was less pleased that its capture eluded him. This was his most notable record of the day. The stratiomyid fly *Neopachygaster meromelaena* (Austen) was also seen around this poplar bole and the pupae of *Solva marginata* (Meig.) (Xylomyiidae) were readily found adjacent to the bark. Subsequently Peter has further remarked that the 14 fungus gnats recorded at Richmond Park was an all time record low score! The most notable species was *Symmerus annulatus* (Meig.) which develops in rotten wood. Other notable species of fly found by Peter were: *Gnophomyia viridipennis* (Gimmerthal) (Tipulidae), *Thereva nobilitata* (F.) (Therevidae), *Agathomyia antennata* (Zett.) (Platypezidae) and *Aulogastromyia anisodactyla* (Loew) (Lauxaniidae).

Andrew Halstead arrived at the site too late and did not succeed in finding the main party, however, he recorded the following interesting beetle species: *Agrilus pannonicus* (Piller & Mitterpacher) (Buprestidae), *Abdera quadrifasciata* (Curt.) (Melandryidae) and *Phymatodes alni* (L.) (Cerambycidae).

Evening meeting. Leader: **Mark Parsons**. Six members attended the evening meeting which was muggy and threatened rain. At least six light traps were operated; two of these traps were run in the Pembroke Lodge area (approx. TQ193729), the rest were run near Pen Ponds (approx. TQ203727). Just over 70 species of macrolepidoptera were recorded with several scarce and local species being noted, these included blotched emerald *Comibaena bajularia* (D. & S.) shaded pug *Eupithecia subumbrata* (D. & S.), great oak beauty, *Boarmia roboraria* (D. &. S.), brindled white-spot *Paradarisa extersaria* (Hübn.), grass wave *Perconia strigillaria* (Hübn.), obscure wainscot *Mythimna obsoleta* (Hübn.), striped wainscot *Mythimna pudorina* (D. & S.) and alder moth *Acronicta alni* (L.). Several microlepidoptera were recorded over the evening, including *Pseudotelphusa scalella* (Scop.) and *Cydia fagiglandana* (Zell.), though perhaps the most interesting catches of the night were three examples of the pyralid *Microthrix similella* (Zinck.), these all late in the evening.

A few species of beetle were recorded at light, though apart from a single example of the stag beetle *Lucanus cervus* (L.) (which was seen flying at dusk), the most interesting were found by searching the old oaks with the aid of a torch. Species recorded included the clerid *Opilo mollis* (L.) and the longhorn *Phymatodes testaceus* (L.) (neither of which were recorded during the day meeting).

The rain held off, apart from the odd slight shower and flash of lightning, until we were in the middle of packing up when the heavens opened! This proved to be a very successful meeting, being particularly useful as it added many recent records of moths to the Richmond Park list. Many thanks are due to the Superintendent of

Richmond and Bushy Parks, Mr Michael Fitt, for permission to hold both of the meetings and to the Park's police and gate staff for letting us out of the gates promptly at the pre-arranged time.

Foulden Common, Norfolk, 8 August 1992

Leader: **I. F. G. McLean**. It was good to see twelve members and their accompanying guests and families defy the weather forecast of torrential rain to enjoy a fine day at this immensely rich and varied locality. Although there was little sun, the morning breeze eased after lunch and warm conditions encouraged plenty of insect activity. Flies, beetles, moths and leafhoppers were the principal interest of the daytime party, while after dusk two members used light traps to record moths more intensively. The meeting was timed to coincide with the flight period of some of the late summer specialities known among the Diptera and other orders, with the expectation of adding to the list of notable species. The 28 hoverflies included *Cheilosia vulpina* (Meig.), *Eumerus strigatus* (Fall.) and *Helophilus hybridus* Loew. Flowers of small scabious *Scabiosa columbaria* L. were searched for the rare conopid *Myopa curtirostris* Kröber but without success. However, the characteristic Breckland species *Prosena siberita* (F.), a tachinid with the proboscis more than half its body length, was found in company with several other tachinids. Among a good selection of tephritids the best find was a single female of the scarce and brightly coloured *Acinia corniculata* (Zett.), while searching at the base of dense vegetation at the margin of pingo depressions yielded some of the short-winged chloropid *Elachiptera brevipennis* (Meig). The dry condition of Foulden Common, following the drought and continued water abstraction in West Norfolk, is giving serious cause for concern regarding the future of the rich aquatic insect fauna (including an exceptional assemblage of water beetles) associated with the pingo pools.

The leafhopper specialist was pleased to find *Aphrophora alpina* Melichar on sallows, and some were kept alive for photography afterwards. Another local leafhopper recorded was the wetland species *Paralimnus phragmitis* (Boh.). The beetles were past peak season, but nevertheless a number of interesting species were recorded, including the ground beetle *Demetrias imperialis* (Germ.) from fen vegetation within a dried out pingo hollow. The sawflies *Tenthredo scrophulariae* L. and *T. omissa* Förster and the aculeate *Tiphia femorata* F. were pleasing finds among the Hymenoptera.

A fine night for moths, with warm, muggy conditions, resulted in 73 species of macros being recorded by two members using four lights. The highlights were *Archanara geminipuncta* Haw., *Ipimorpha subtusa* D. & S., *Perizoma bifaciata* Haw., and *Trichiura crataegi* L. At the conclusion of trapping around 1.15 a.m. (BST) a spectacular thunderstorm lit up the common with a vivid lightning display, before torrential rain came down on the journey home. Thus was the pessimistic weather forecast fulfilled about 18 hours late!

Nunhead Cemetery, London SE15, 23 August 1992

Leader: **R. A. Jones**. Five members and friends joined the leader on a dry, slightly overcast day with sunny spells. The appearance of the dragonfly *Sympetrum striolatum* (Charp.) caused some amusement when the leader suddenly realized that he had not one single dragonfly record for the area!

Hoverflies abounded on the hogweed umbels, but the recently discovered wasp *Dolicovespula media* (Retz.), noted a few days earlier, did not show itself. *Conops ceriaeformis* Meig. was seen mating on ragwort flowers, this is the most common conopid fly in this area of south-east London. The local "speciality" *Cicones undata*

Guér. Mén. (Coleoptera: Colydiidae) was found under sycamore bark in two parts of the cemetry, and is obviously still well established. Towards evening it began to drizzle, and although one person arrived for moth trapping, it was felt that the night showed little promise and the meeting was abandoned.

Fig. 1. Nunhead Cemetery field meeting, 23 August 1992. Left to right are: Martin Henderson, Roger Hawkins, Rosemary Hill, Peter McQueen and Ron Boyce. Photo: R. A. Jones.

SHORT COMMUNICATION

A new aberration of *Diachrysia chrysitis* L. (Lepidoptera: Noctuidae), the burnished brass: ab. *suffusa* ab. nov.—The broad golden brassy ante- and post-median fasciae are suffused with metallic brownish purple. In the antemedian fascia the suffusion fades towards the centre. In the postmedian fascia the suffusion is densest on the dorsum and edging the subterminal line, but fading towards the postmedian line.

The aberration is not necessarily confined to the golden form (ab. *aurea* Huene), but would apply to the greenish form as well.

Type male: Goodworth Clatford, Hampshire, 2.vii.1991, exhibited at the annual exhibition 1991 and now in the National Collection of Lepidoptera at the Natural History Museum, London.

My thanks to David J. Carter of the Natural History Museum for researching the literature of the species.—A. H. Dobson, 282 Britten Road, Brighton Hill, Basingstoke, Hampshire, RG22 4HR.

BOOK NOTICE

Arthropods of medical and veterinary importance: a checklist of preferred names and allied terms compiled by A. R. Pittaway, Wallingford, Oxon, CAB International, 1991, 178 pages, paperback, £15.—As with many 'pest' species, those with medical or veterinary significance transgress geographical or political boundaries, and national checklists are of only ephemeral use. This international checklist of species is an attempt to provide a single reliable source of scientific names. Although 152 of the 178 pages are given over to arthropods, checklists are appended for microorganisms, viruses, fungi and helminths together with a list of certain fish used in biological control.

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Cover illustration: Head of *Asilus crabroniformis* L. (Diptera: Asilidae), Wiltshire, August 1988. Photo: R. D. G. Barrington.

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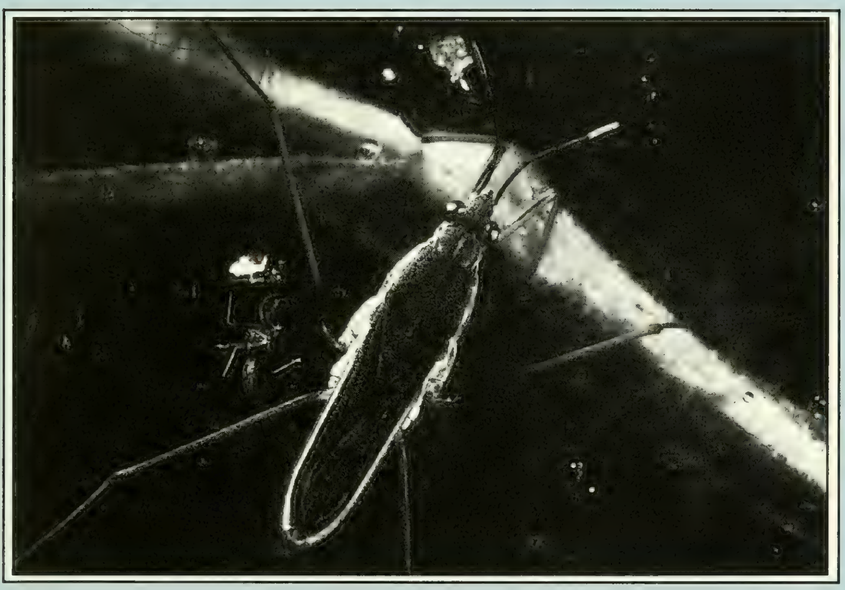

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Cover illustration: a water skater, *Gerris* sp. (Hemiptera: Gerridae), Newhaven, Sussex, July 1984. Photo: R. A. Jones.

COLIAS CROCEUS GEOFFROY IN FOURCROY (LEPIDOPTERA: PIERIDAE) IN ARGYLLSHIRE, AND SOME SUGGESTIONS FOR FURTHER STUDY

LEONARD WINOKUR

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I collected a male and female of *C. croceus* from the disused quarry at Oban, Argyllshire (56° 25′ 06″ N, 5° 26′ 49″ W), 5.viii.1992, and a further female from the ruins of the Oban 'Hydro', 8.viii.1992; I took a further eight males and six females from North Shian, Argyllshire (56° 32′ 32″ N, 5° 24′ 03″ W), 14.viii.1992. *C. croceus* is a rare migrant in Scotland, with just 22 recorded migrations into the country, the most recent of these in 1976 (Thomson, 1980; Gardiner, 1984). There appear to be no records however for Oban or North Shian. The quarry, 20–50 m altitude, was sparsely vegetated, in contrast to the 'Hydro' site 0.6 km to the WSW; the 'Hydro' and North Shian habitats comprised open areas at 60 m and 10–30 m altitude respectively, well vegetated with various Gramineae, *Lotus* and *Trifolium*, on south-facing mixed woodland slopes. All specimens were of the typical orange form and were taken between 12.00 and 14.00 h BST.

Insects arriving in Scotland in June occasionally produce a native Scottish brood in August (Thomson, 1980). I believe that *C. croceus* was reported on the Isle of Mull in June 1992 (Martin C. White, citing Neil Cravenscroft, pers. comm.), suggesting that the specimens listed above represent such a brood. Whether these specimens originate locally or from Mull however is not ascertained. On account of the scarcity of the species in Scotland, I attempted to pair the animals in order to obtain a further generation of the Scottish stock and to test for the possible presence of the *helice* gene in the parental sample. Although the species does not normally survive British winters (Thomas & Lewington, 1991), the species can overwinter as a larva under mild and dry conditions (Eveleigh, 1984). Below I present some findings from the breeding programme and suggest some avenues of further research.

The North Shian specimens were transported to Oban in 2½″ diameter perspex-bottomed card boxes. The butterflies were placed outdoors over cut *L. corniculatus* L. in an improvised breeding cage constructed from a net bag, an earthenware pot and lengths of cane. Food and water were provided by cotton wool pads charged with 10% honey solution. These were placed on top of the netting and replaced 2–3 times daily, when the cage was sprayed liberally with water. This protocol was continued, and from 16.viii.1992 in Colwyn Bay, Clwyd, until my return to Reading on 23.viii.1992 when the insects were transferred to a cage containing growing *L. corniculatus* but otherwise similarly maintained. Ova laid on the cut foodplant were placed indoors still attached to the leaves. On hatching, the larvae were transferred to the growing plant.

On 1.x.1992 I counted 132 larvae, 30 of which I dispersed elsewhere. Twenty adults eclosed over the period 17.x.1992 to 23.xi.1992 (cohort 1). Temperature (mean $\pm$ SD) over the period 23.viii.1992 to 23.xi.1992 was 10.8 ± 5.4°C. At the beginning of December the remaining larvae were placed indoors in 5″ diameter translucent perspex tubs, under natural daylength but away from direct moisture, and these replenished with cut foodplant at three-day intervals. Twenty-three of these animals survived and eclosed over the period 20.xii.1992 to 15.i.1993 (cohort 2). Temperature over the period 24.xi.1992 to 30.xi.1992 was 7.8 ± 4.1°C. Outdoor temperature over the remainder of

the rearing period was 4.6 ± 4.9°C; although indoor temperature was not recorded during this period, it might be expected to be warmer. The above results represent an overall survival ratio of 38%.

The F_1 yielded ten typical and twelve white f. *helice* females, indicating the presence of the *helice* gene among the parental males; the allele is dominant but sex-limited in its expression (Ford, 1945). Hence, if one parent of a two-parent brood carries the *helice* gene, 50% of female offspring will be f. *helice*. While the 50% type to 50% f. *helice* ratio obtained might therefore suggest that all the male parents carried the gene, this is unlikely, so it can be concluded only that at least one of the male parents carried the gene and that variable F_1 survival from the various parent females produced, by chance, an equal type to f. *helice* ratio.

The emergence of cohort 2 over December and January indicates that the brood had to a degree been 'forced', suggesting that higher temperatures than normal for the winter were acting on the larvae. In many Lepidoptera, larvae grow more quickly at warmer temperatures but weigh less at maturity (Ray, 1960), and indeed the adults of cohort 2 were noticeably smaller than those of cohort 1 supporting the above contention. In both sexes, the orange ground colour was paler in cohort 2 than in cohort 1, and the dark outer wing areas also more extensive in a number of specimens. These associated changes in pattern may represent a shift in the allocation of metabolic resources from ground colour pigmentation to melanization of the extended pattern elements, and it is notable that among the f. *helice* females which lack the orange background pigmentation, those from cohort 2 exhibited further developed pattern elements. Such pattern modification further suggests that cohort 2 developed under an unfamiliar temperature and daylength regime, since development can be expected to have only had an opportunity to have become canalized so as to produce 'normal' type and 'normal' f. *helice* phenotypes under conditions typically experienced in the wild.

Nylin & Svärd (1991) argue that in migratory species, local evolution will be prevented by recurrent gene flow and the need for genotypes each suited to a wide range of conditions, so that specimens from disparate latitudes should show little difference in size despite their developing under different temperatures and daylengths, as they report for *Pieris brassicae* L. (Lepidoptera: Pieridae). However, the capacity for organisms to exhibit different morphologies and life histories under different environmental conditions depends not on genetic differentiation, but on developmental plasticity, which the foregoing results show *C. croceus* to exhibit, and which has long been known in several other migratory species (e.g., Kettlewell, 1944, 1963). In fact, it is also upon developmental plasticity that the capacity for individuals of different *genotype* to exhibit different characteristics depends, for populations exhibiting identical morphologies can differ considerably in their genetic constitution (Oliver, 1977). Of course, evolutionary processes can then result in an increase in the importance of heredity in the extent to which the particular phenotypes are determined by heredity and by the environment (Waddington, 1961), and it is important to recognize that the hereditary factors that condition the phenotype an organism expresses under a particular environment can include not only genetic but also cytoplasmic factors (Ho, 1984). Moreover, the evolutionary processes involved need not require genetic variability or selection (Sonneborn, 1970; Cullis, 1983; Ho *et al.*, 1983; Winokur, 1989), considerations commonly discounted or misunderstood in ecological studies.

Control of voltinism and phenotype in *Colias* butterflies appears to have been little studied (Friedrich, 1986). Rearing *ex ovo* under laboratory temperature and photoperiod regimes would improve understanding of the influence of environmental factors on growth rate, diapause induction and adult morphology. 'Transplant experiments' comparing samples of different origin under a suite of regimes would help determine

the relative importance of heredity and environment in conditioning their performance, when reciprocal crosses could specifically identify maternal (cytoplasmic) influences. Continued breeding programmes in conjunction with environmental manipulations could reveal novel hereditary and evolutionary phenomena (Winokur, 1989). No such studies involving a migratory butterfly are known to the author. Field and museum studies including specimens from northerly locations (Thomson, 1980; Eveleigh, 1984) on the other hand, would enable further characterization of latitudinal size trends.

Acknowledgements

The records documented here arose while collecting samples for a NERC-funded investigation into climatic and intrinsic population factors conditioning norms of reaction of life history components in populations of *Pararge aegeria* L. (Lepidoptera: Satyridae) supported by Professors Robert M. Smith and Richard M. Sibly. Temperature data were provided by The Meteorological Office. I also thank John and Ina Campbell for provision of the tub, dowels and use of their garden.

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SHORT COMMUNICATIONS

Pre-hibernation parasitoid-induced mortality in larvae of *Ladoga camilla* (L.) (Lepidoptera: Nymphalidae).—On 21.viii.92, two third-instar larvae of *Ladoga camilla* were collected in a Devonshire woodland showing signs of failure to diapause. This is an unusual event with *L. camilla* under natural conditions, except rarely in exceptionally early seasons.

Shortly after their collection, it became apparent that the larvae were paratisized and both larvae died in their third instars. The subsequent parasitoids and their cocoons were retained for identification. At the 1992 BENHS Annual Exhibition, these were identified by Dr M. R. Shaw and were subsequently presented to him.

From one, a female *Phobocampe* sp. (Ichneumonidae: Campopleginae) had hatched. From the other a female *Mesochorus* sp. (Ichneumonidae: Mesochorinae) had emerged. All Mesochorinae are "true" hyperparasites—the female lays its eggs in a parasitoid larva while the latter is itself feeding inside the host. The original parasitoid goes on feeding, emerges from the host and makes its cocoon. It is then killed by the mesochorine larva and its adult emerges in due course.

I have occasionally collected parasitized *L. camilla* larvae from the wild, but the parasitoids do not kill the larvae until the final instar, the following year having apparently diapaused within the host. However, if diapause of parasitized larvae is prevented (using a fixed long day length on 1- to 7-day-old larvae), the parasitoids similarly do not diapause and kill the larva in the final instar in late August or September of the same year.

I am indebted to Dr M. R. Shaw for his invaluable help and information.—K. E. J. Bailey, Dipfield, Thorverton, Near Exeter, Devon EX5 5PJ.

Reference

Shaw, M. R. 1981. Parasitism by Hymenoptera of larvae of the white admiral butterfly, *Ladoga camilla* (L.), in England. *Ecol. Ent.* **6**: 333–335.

***Silpha obscura* L. (Coleoptera: Silphidae) new to Wales.**—Hyman & Parsons (1992) have recently drawn attention to the fact that this species has declined over much of its English range and that recent records are all from the south-west. They have accordingly given it Red Data Book category 2 (vulnerable) status. It is particularly pleasing therefore to report it from Pembrokeshire, new to Wales: Whitesands Bay (SM 733272), 25.vi.1988, during a field meeting of the Dyfed Invertebrate Group. A single beetle was found on the coastal path where it crosses wind-blown sand grassland on the north side of the bay. My only other record for this species is of a single specimen at Pentire Head (SW 935805), E. Cornwall, 12.vii.1979. The clifflands of south-western Britain are proving to be an important last reserve for many of our open country species which continue to be threatened inland by agricultural, tree-planting and other developments.—K. N. A. Alexander, 22 Cecily Hill, Cirencester, Gloucestershire GL7 2EF.

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THE BRITISH SPECIES OF *MONOCHROA*, *CHRYSOESTHIA*, *PTOCHEUUSA* AND *SITOTROGA* (LEPIDOPTERA: GELECHIIDAE)

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This is the third in a series of papers describing and illustrating the British Gelechiidae. The first (Sokoloff, 1985) covered the genera *Teleiodes* and *Teleiopsis* and dealt with general aspects of the family. The second paper (Sokoloff & Bradford, 1990) dealt with the genera *Metzneria*, *Paltodora*, *Isophrictis*, *Apodia*, *Eulamprotes* and *Argolamprotes*. In this paper we cover 17 species from the genera *Monochroa*, *Chrysoesthia*, *Ptocheuusa* and *Sitotroga*.

In describing the forewing, the nature and relative positioning of the darker spots (stigmata) are often characteristic. Discal spots and costal markings are above the fold in the wing with the plical spots and tornal markings below. Their relationship is illustrated in Figure 1. Positioning of a spot can conveniently be described by a fraction—for example "dark spot at two-thirds" means that the spot is approximately two-thirds of the way along the wing measured from the base towards the apex.

Where they are adequate, descriptions follow those of Meyrick (1928). Additional life history data are taken from Emmet (1988, 1991). Where early stages are unknown in the British Isles, continental data is given. Sources include Eckstein (1933), Medvedev (1990) and Buhl *et al.* (1989, 1992). Nomenclature follows that of Bradley & Fletcher (1986) amended by Emmet (1987).

Monochroa Heinemann

The genus *Monochroa* is represented in the British Isles by 13 species, two of which are recent additions to the British list, one of these being described as new to science. The larvae of most species feed in the leaf blade, the rootstock, or mine the stem of various plants. All the British species are univoltine.

The life histories of several species are still incompletely understood or unknown. The adults can be secretive in habit and easily overlooked. With few exceptions, the genus is poorly recorded in the British Isles.

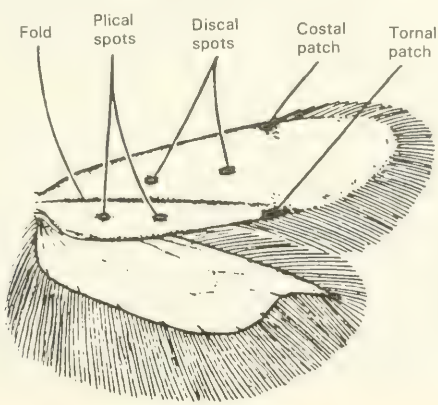

Fig. 1.

Monochroa tenebrella (Hübner), Plate I, Fig. 1

Wingspan 10–12 mm. Apical third of antenna white in female. Forewing unicolorous dark shining purplish-bronzy-fuscous. Hindwing grey.

Moth flies June to July. Widely distributed throughout the British Isles. Common to abundant in suitable habitats of downland and scrubland. The moth flies close to the ground, especially in sunshine.

Larva reddish; spots brown; head and prothoracic plate black-brown. Feeding in the rootstocks of sheep's sorrel, *Rumex acetosella* L., September to April. Pupates in the larval habitation.

Monochroa lucidella (Stephens), Plate I, Figs 2, 3, and 4

Wingspan 12–14 mm. Ground colour of forewing fuscous, unevenly sprinkled ochreous-whitish, often forming indistinct, lighter fasciae; an oblong ochreous-whitish suffusion in disc at two-thirds, followed by a dark fuscous dot; an indistinct ochreous-whitish tornal spot beneath this and a costal spot beyond. Hindwing grey. Three colour forms of this species are illustrated, although others are known.

Moth June to July. Widely distributed in England to Yorkshire, north Wales, south Wales and southern Ireland in suitable wet habitats.

Larva pale greenish-grey-ochreous; dots minute, black; head black, prothoracic plate brownish-grey. Feeding in the stems of common spike-rush (*Eleocharis palustris* (L.)) May to June, but also occurs regularly in areas where *E. palustris* is absent. On the Continent the larva also feeds in reedmace (*Typha* spp.). Pupal habit unknown, but probably in the stem of the foodplant.

Monochroa palustrella (Douglas), Plate I, Fig. 5

Wingspan 17–19 mm. Ground colour of forewing pale brown, veins more or less marked with whitish streaks; interneural spaces mixed blackish; stigmata blackish, white-edged; plical and first discal elongate, second discal roundish. Hindwing grey.

Moth late June to August. Apart from a record from Exmoor, seemingly restricted to south-east England from Huntingdon, Cambridge and Suffolk south to Kent and Surrey. Favours dry pastures inland, sand-dunes and other maritime situations.

Larva whitish-pink, dorsal, sub-dorsal and subspiracular lines irregular dull crimson; tubercles brown; head deep orange; prothoracic plate brownish-ochreous or dark brown, black-marked. Feeding in the leaf petiole, stem and rootstocks of curled dock (*Rumex crispus* L.) and possibly other *Rumex* species. April to June. Pupates amongst the rootstock.

Monochroa tetragonella (Stainton), Plate I, Fig. 6

Wingspan 9–11 mm. Ground colour of forewing light fuscous, more or less sprinkled dark fuscous; a black dot in disc towards base, another below costa at two-fifths; stigmata dark fuscous, first discal much beyond plical. Hindwing pale grey.

Moth June to July. Eastern and southern coastal counties in England in salt-marshes.

Larva crimson reddish; pinacula minute, black; head ochreous-yellow; prothoracic plate dark brown. Feeding in the stem and roots of sea milkwort (*Glaux maritima* L.). April and May, usually killing the foodplant.

Monochroa conspersella (Herrich-Schäffer)
(*morosa* Mühlig; *quaestionella* Herrich-Schäffer), Plate I, Fig. 7

Wingspan 11–12 mm. Ground colour of forewing dark fuscous; stigmata very indistinctly darker, first discal much beyond plical; usually a pale oblique mark on costa at three-quarters. Hindwing light grey.

Moth July to August. Very few confirmed records, these being from Lincoln, Cambridge, Huntingdon, Norfolk and Kent, typically in fens or marshes.

Larva yellowish, posteriorly with suffused reddish stripes; head yellowish; prothoracic plate brown. Feeding in spun shoots of yellow loosestrife (*Lysimachia vulgaris* L.). Continental authors also record the closely related *Lythrum* spp. as foodplants.

Monochroa hornigi (Staudinger), Plate I, Fig. 8

Wingspan 9–12 mm. Ground colour of forewing chocolate brown-fuscous, sprinkled with lighter brown scales; an oblique darker fascia from costa at one-third; an oblique pale-yellowish streak from costa at two-thirds, sometimes indistinct; a black spot beneath streak; darker fuscous mark on fold at one-third. Hindwing dark grey.

Moth July to August. Recorded from Hertfordshire, Kent, London, and Hampshire.

Larva yellowish-grey, longitudinal line reddish; head brown. Continental authors record the larva feeding in the stem or side branches of *Polygonum* spp.; no external evidence of feeding. Larval period unknown. Pupa in a white silken cocoon on the stem near a node. In Britain found in gardens, parks and similar habitats, but on the Continent usually associated with marshy ground.

First discovered in Britain in 1963 during a survey of Buckingham Palace gardens (Bradley, 1963).

Monochroa niphognatha (Gozmany), Plate I, Fig. 9

Wingspan 12–13 mm. Head whitish-ochreous, becoming fuscous towards vertex. Ground colour of forewing whitish-ochreous; discocellular stigma dark fuscous; subcostal oblong fuscous stigmata at one-sixth and one-third; an indistinct, fuscous mid-plical mark. Hindwing grey.

Moth June to July. Kent. Larva unknown in Britain. In Sweden the species is always found in damp meadows. In Denmark the larva has been found in the stems of amphibious bistort (*Polygonum amphibium* L.) (Buhl *et al.*, 1989). Yellow loosestrife (*Lysimachia vulgaris*) has also been suggested as a foodplant, but we know of no confirmed records.

The moth was first discovered in Britain in 1984 (Chalmers-Hunt, 1985) in an extensive freshwater marsh in Kent. The species has been taken in this locality over a period of years and is clearly breeding there. No other British localities are known.

Monochroa suffusella (Douglas), Plate I, Fig. 10

Wingspan 10–13 mm. Head whitish. Ground colour of forewing whitish-ochreous, posteriorly irrorated brown, costal edge whitish; second discal stigma dark fuscous; a black costal dot above it. Hindwing pale grey.

Moth June to July. Widely but sparsely distributed in England south of Yorkshire and north Wales although unrecorded from many counties. Absent from south-west England. Habitat fens and marshes. Adult crepuscular.

Larva unknown in Britain. In Denmark the larva has been found mining the stem of common cottongrass (*Eriophorum angustifolium* Honck.) (Buhl *et al.*, 1992). Medvedev (1990) gives poplar (*Populus* spp.) as the foodplant, although this is a rather surprising suggestion.

Monochroa lutulentella (Zeller), Plate I, Figs 11 and 12

Wingspan 14–16 mm. Ground colour of forewing varying from light ochreous-brownish to dark fuscous, glossy; second distal stigma indistinctly darker. Hindwing very pale grey. Abdomen ochreous-yellowish near thorax.

Moth late June to early August. Widely but sparsely distributed in southern England south of Derbyshire although unrecorded in many counties. Western Ireland. Habitat fens and marshes.

Larva unknown in Britain but on the Continent feeding in rootstock of meadowsweet (*Filipendula ulmaria* (L.)).

Monochroa elongella (Heinemann), Plate I, Fig. 13

Wingspan 12–14 mm. Antenna with three pale rings on apical third. Forewing fuscous; stigmata darker, indistinct: two anterior elongate; first discal much beyond plical; indistinct darker elongate marks in disc towards base, beneath costa before middle, and below first discal stigma; some whitish scales on tornus and a whitish spot on costa opposite. Hindwing grey. Abdomen pale ochreous-yellowish near thorax.

Moth June to July. Recorded from North Devon, East Sussex and West Norfolk.

Larva said to feed on silverweed (*Potentilla anserina* L.).

Monochroa arundinetella (Stainton), Plate I, Figs 15 and 16

Wingspan 9–10 mm. Ground colour of forewing fuscous; darker marks on costa near base, and on fold; an oblique whitish costal mark at two-thirds, beneath which is a short blackish dash; sometimes some whitish scales on tornus opposite, preceded by darker suffusion. Hindwing light grey.

Moth June to July. Very local in central southern England from North Wiltshire north-eastwards to Norfolk, in wet localities.

Larva slender, whitish; head blackish; prothoracic plate with black lateral spots. Mining in long galleries in the leaves of lesser pond-sedge (*Carex acutiformis* Ehrh.). March to May, pupating in a cocoon on a leaf just above water level.

Monochroa divisella (Douglas), Plate I, Fig. 17

Wingspan 15–16 mm. Ground colour of forewing brownish, sprinkled ochreous-whitish, lower edge of suffusion running straight from middle of base to apex; plical and second discal stigmata black, former elongate. Hindwing light grey.

Moth June to July. Very few confirmed records. Apparently restricted to Cambridgeshire and Norfolk. Larva unknown in England, but on the Continent feeding on *Iris* spp.

Monochroa moyses Uffen, Plate I, Fig. 18

Wingspan 8–9 mm. Ground colour of forewing light fuscous, scales with pale bases

Plate I. SOKOLOFF AND BRADFORD 1993

1. M. tenebrella

2. M. lucidella

3. M. lucidella

4. M. lucidella

5. M. palustrella

6. M. tetragonella

7. M. conspersella

8. M. hornigi

9. M. niphognatha

10. M. suffusella

11. M. lutulentella

12. M. lutulentella

13. M. elongella

14. S. cerealella

15. M. arundinetella

16. M. arundinetella

17. M. divisella

18. M. moyses

19. C. drurella

20. C. sexguttella

21. C. sexguttella

22. P. paupella

and fuscous tips. A dark mark formed of first few costal cilia, visible both above and beneath the wing. A short row of ochreous scales form an inconspicuous upper oblique dash behind this mark. A dark stigma three scales wide and three long lies on or just behind the mid-line of the wing opposite the tip of this dash. Pale dash is faintly continued as a series of dashes parallel to costa nearly to wing tip. A dark line close to base of the cilia passes round the wingtip and fades there. Hindwing grey, mottled by gaps in the single layer of scales. Costal cilia and those towards apex of hindwing darker than wing.

Moth May to August. South-east England, to date recorded from Hampshire, Sussex, Kent, Essex and East Suffolk in fens and marshes.

Larva white, cylindrical. Feeding in the leaves of sea club-rush (*Scirpus maritimus* L.). August to April, the larva leaving the mine in winter, boring into the stem for hibernation (Langmaid, 1992).

The earliest example of this moth is a specimen taken in Essex in 1971. Larvae had been noted for a number of years but it was not until 1987 that the late E. C. Pelham-Clinton succeeded in breeding a moth—the unnamed specimen being figured in colour in this journal (Pelham-Clinton, 1989). This and other specimens were recognized as new to science, and described as *moyses* (Uffen, 1991).

Chrysoesthia Hübner

Represented in the British Isles by two species. Bivoltine.

Chrysoesthia drurella (Fabricius), Plate I, Fig. 19

Wingspan 8–9 mm. Head and thorax dark metallic brassy-grey. Forewing bright orange; a silvery-leaden-metallic fascia, edged black and sometimes incomplete, before middle and an irregular number of silvery-leaden-metallic spots or streaks, mostly edged black, before and after the fascia. Hindwing dark grey.

Moth bivoltine, May to June, August and September. Widely distributed in English counties. Recorded also from Lanarkshire, but seemingly absent from Wales and Ireland.

Larva yellow-whitish, more or less spotted crimson; head pale brown. Feeding in leaves of *Chenopodium* and *Atriplex* making greenish blotches. July and September. Autumn larva overwinters in a cocoon. The summer larva does not form a cocoon. Pupates in detritus at ground level.

Chrysoesthia sexguttella (Thunberg), Plate I, Figs 20 and 21

Wingspan 8–10 mm. Head metallic brassy-grey. Forewing dark purplish-grey, mixed black, with some whitish scales; a yellow subdorsal spot in middle and a smaller one in disc posteriorly; an ill-defined ochreous-white tornal spot and another on costa at three-quarters. Hindwing grey.

Moth bivoltine. May to June, August. Widely distributed throughout the British Isles.

Larva yellow-whitish; dorsal line brownish; a lateral line of orange-reddish spots; head pale brown, prothoracic plate blackish. Feeding in the leaves of *Chenopodium* and *Atriplex* making whitish blotches, the larva ejecting most of the frass. June, September and October. Pupates in detritus at ground level.

Ptocheuusa Heinemann

Represented in the British Isles by a single species.

Ptocheuusa paupella (Zeller), Plate I, Fig. 22

Wingspan 10–12 mm. Ground colour of forewing light ochreous-yellow speckled with black scales; costa white; an indistinct inwardly oblique slender white fascia before middle and another at three-quarters. Hindwing pale grey.

Moth bivoltine June, and August to September. Widely distributed and often common in southern England from Leicester southwards; West Lancashire and southern Ireland. Not recorded from Wales or Scotland.

Larva pale yellowish; head dark fuscous. Feeding in seedheads of common fleabane (*Pulicaria dysenterica* (L.)), golden samphire (*Inula crithmoides* L.), common knapweed (*Centaurea nigra* L.) and *Mentha*. July, September and October. The larval feeding in *P. dysenterica* distorts the florets in the seedheads.

Sitotroga Heinemann

Only one species of this cosmopolitan genus occurs in the British Isles.

Sitotroga cerealella (Olivier), Plate I, Fig. 14

Wingspan 11–16 mm. Ground colour of forewing pale ochreous, more or less sprinkled brownish; plical and second discal stigmata blackish; often a blackish tornal spot; some black scales at apex and an apical bar in cilia. Hindwing grey.

Moth continuously brooded under suitable conditions. Records widely scattered over British Isles, mainly indoors in stored grain and occasionally in the seeds of dried flowers and artefacts such as 'corn dollies'.

Larva wholly pale yellowish. Feeding in seeds of cultivated cereals and legumes. Recorded foods in Britain and abroad include barley, rye, oats, maize, wheat, rice, sorghum, buckwheat and bamboo. This species is a pest of whole cereal grains in warm, temperate regions and throughout the tropics. The larva usually develops within a single grain. In stored grain infestations the damage is usually confined to the outermost exposed areas as the moth is too delicate to penetrate densely packed grain. One of the few gelechiids that has attracted sufficient attention to be given a common name—the Angoumois grain moth.

Acknowledgement

We would like to thank R. J. Heckford for reading the manuscript and making many helpful suggestions.

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SHORT COMMUNICATION

***Terellia vectensis* (Collin) and *Urophora spoliata* (Hal.) (Diptera: Tephritidae) reared from dead seed-heads of saw-wort in Cornwall.**—I first reported *Urophora spoliata* from the Boscastle area of E. Cornwall in 1989 (Alexander, 1991) and, when confirming my identification, Ian White commented that "it would be nice if somebody could at least find out what kind of gall it forms". I was in the Boscastle area again during May 1990 and took the opportunity to collect some dead seed-heads of *Serratula tinctoria* L. in the hope of rearing further *U. spoliata*. The seed-heads languished in a container for some time afterwards, but, eventual re-examination revealed two dead flies: one each of *U. spoliata* and *Terellia vectensis*—the latter new to Cornwall!

The collection site lies to the south-west of the previously reported Pentargon Cliff locality, on the north-west-facing slopes between Boscastle Harbour and Forrabury Common (SX 094913). The grassland here has remained ungrazed for many years and is fairly rank as a result. *Serratula* is abundant.

White (1988) gives the distribution of *T. vectensis* as Hampshire, the Isle of Wight, and South Wales. Falk (1991) adds Dorset, and Stubbs (1992) Wiltshire.

Ian White has now examined the gall formed by *U. spoliata* and comments that it appears to be formed rather like those of *U. quadrifasciata* (Meig.), i.e. as lignified achene walls rather than from receptacle tissue, as is the norm for most *Urophora* spp. of known biology. A gall has been passed to the Natural History Museum collection.

My thanks to Ian White for his continued encouragement—K. N. A. Alexander, National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1QW.

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GERANOMYIA BEZZII ALEXANDER & LEONARD (DIPTERA: LIMONIIDAE), A MARINE SPECIES NEW TO IRELAND

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On 5.vii.1991 one of us (J.P.O'C.) collected a single male of the marine limoniid, *Geranomyia bezzii* Alexander & Leonard, at Fethard, Co. Wexford (S7905). It was identified using Coe (1950). This is the first record of this species from Ireland and represents a significant extension of its range in the British Isles. A coastal lagoon exists at the Fethard site and the specimen was probably collected near the high-water mark where mud flats are present. Shingle banks also occur there.

Another *Geranomyia* species is known from several Irish sites. Haliday (1833) originally described *G. unicolor* from adults taken among the rocks near the harbour at Donaghadee, Co. Down in the middle of July 1832. This species breeds in salt water, the larvae having been discovered in filamentous algae (Saunders, 1930).

G. bezzii is also marine and according to Geiger (1986) the larva is described by Seurat (1924). It is only known from seven coastal sites in southern Britain in counties Devon, Dorset (2 sites), Hants, Sussex, Suffolk and Norfolk (Stubbs, 1978; Falk, 1991). *G. bezzii* is listed in the British Red Data Book as a vulnerable species (Shirt, 1987). It inhabits coastal lagoons where the upper tidal shore has gravel with the alga *Enteromorpha*. One of the few marine craneflies independent of saltmarsh, its potential habitat is of limited occurrence. Threats include sailing and other amenity facilities and gravel extraction.

Outside the British Isles the species is known from Albania, Italy, North Africa (Algeria, Libya and Tunisia) and the Canary Islands (Savchenko *et al.*, 1992). This disparate distribution indicates that the species is probably more widely distributed and it could be expected in coastal lagoons on the French, Spanish and Portuguese coasts and throughout the Mediterranean basin region. The specimen has been presented to the National Museum of Ireland.

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ANNOUNCEMENTS

Larvae of the British macrolepidoptera—a plea.—Those who have attended the annual exhibition over the last few years will be aware of the work being done to photograph the larvae of all the butterflies and larger moths. All except about 30 have now been photographed, and text is being prepared for eventual publication. While we accept that we can never expect to find every species that is on the British list, it should still be possible to find some of these 30 species. We therefore appeal to all British and Continental lepidopterists to make every effort to make this important work as complete as possible. What is needed are the larvae, or females or ova which might lead to the species being bred, or alternatively, good quality slides. British or foreign material is acceptable. The larvae required are:

hecta	gold swift	sublustris	reddish light arches
castaneae	reed leopard	furva	confused
asella	triangle	versicolor	rufous minor
arion	large blue	captiuncula	least minor
epiphron	mountain ringlet	brevilinea	Fenn's wainscot
otregiata	Devon carpet	crinanensis	Crinan ear
taeniata	barred carpet	oculea	ear moth
blomeri	Blomer's rivulet	tridens	Burren green
coracina	black mountain moth	haworthii	Haworth's minor
sericea	northern footman	musculosa	Brighton wainscot
cribraria	speckled footman	parva	small marbled
strigula	small black arches	salicalis	lesser belle
aerugula	scarce black arches	taenialis	white-line snout
ravida	stout dart	humidalis	marsh oblique barred
irregularis	viper's bugloss	emortualis	olive crescent
diffinis	white-spotted pinion		

We would also be interested in foreign material of extinct British species such as dysodea (small ranunculus), atriplicis (orache) etc.

If you can help in any way please contact—Jim Porter, 45 King Charles Road, Surbiton, Surrey, Tel. 081 399 9592.

Larger moths of the London area, by Colin W. Plant.—A comprehensive A4 hardback book of some 300 pages, due to be published in July 1993. Detailed distribution maps for all resident species. Foreword by Bernard Skinner. Line illustrations by Rob Dyke.

Special introductory offer—only £14.95 inclusive of postage and packing. The price after 31 December 1993 will be £19.95, so act now and save £5.

To receive your copy at the special introductory price, send a cheque for £14.95, payable to 'LNHS', to: LNHS Publication Sales, 3 Chatsworth Gardens, West Harrow, Middlesex HA2 0RS. Please remember to include your name and address.—London Natural History Society—Registered charity number 206228.

BOOK REVIEWS

Martin Lister's English spiders (1678), edited by John Parker and Basil Harley. Colchester. Harley Books, 234 pages including 1 colour and 12 monochrome plates, hard back £49.95, paper back £24.95.—Martin Lister (1638–1712) is described in this book as 'the father of British arachnology'. He was certainly one of our first arachnologists. He was also interested in molluscs and has been described as 'the father of conchology'.

He lived at a time when natural history in this country was just beginning to be studied for its intrinsic interest, aided by the newly arrived microscopes. He was a friend of John Ray and other leading naturalists and was elected to the Royal Society in 1676, shortly after its formation.

An account of the life of Martin Lister (including his ancestry) introduces the first English translation of *Tractatus de Araneis*. The appendix contains a selection of correspondence between Lister and various members of the Royal Society. Particularly fascinating is the reproduction of Lister's plate illustrating the 38 species (including some harvestmen and a mite) which he describes, accompanied by a coloured plate of these arachnids by Mike Roberts.

The *Tractatus* starts with a general description of the 'family' of spiders. It is interesting to realize how much was known about spiders not only to Lister but also to Aristotle from whom Lister quotes freely. It seems to have been generally known that spiders produced silk, though Lister asserts that it comes from the anus. He had also noticed spiders ballooning. Normally spiders fasten the silk to the substrate. The silk is then pulled out of the spinners solidifying as it comes. Spiders cannot, as Lister supposes, 'project' the silk and it is still a matter for conjecture how they produce free-floating threads as used in ballooning! He wondered whether the 'two-eyed' spiders (harvestmen) also produced silk, as, of course, they cannot.

Altogether this book is a fascinating historical document.

FRANCES MURPHY

Provisional atlases of the . . . of Britain and Ireland, Monks Wood, Huntingdon, Institute of Terrestrial Ecology, paperbacks. **Click beetles**, Howard Mendel, 1990, 89 pages, £5.50. **Larger Brachycera**, C. M. Drake, 1991, 132 pages, £5. **Tipulinae**, Alan E. Stubbs, 1992, 134 pages, £5.00. **Cryptophagidae—Atomariinae**, Colin Johnson, 1993, 92 pages, £5.50.—There can be nothing more stimulating for many, than to examine the blank areas of a distribution map and discover that a 'new to' record is now available. It is on a national scale that dot-maps come into their own, clearly showing different distributions. As well as the maps and a short discussion of each species, an up-to-date nomenclature is used and useful bibliography included.

The Psylloidea (Homoptera) of Fennoscandia and Denmark, F. Ossiannilsson, Leiden, E. J. Brill, 1992, Fauna Entomologica Scandinavica Volume 26, 348 pages, hardback, Gld 180/US$102.86 (approx. £66).—Another in this excellent series of books, combining detailed description with clear and extensive (1415) diagrams. The book covers the 98 species occurring in the region, plus a few extras which might occur. This fauna includes 61 of the 77 British species listed in Hodkinson and White's (1979) Royal Ent. Soc. handbook, plus two additional species previously regarded as only varieties. A checklist would have enhanced the book. Unlike others in the series, there are no colour plates, but there is a single black and white plate of the adults of nine selected species.

EDITORIAL

HOUSE STYLE 4. CITATION OF EXHIBITS

The report of the Society's Annual Exhibition is the largest single 'item' to be published in the Journal each year, and along with the reports of exhibits, announcements and communications at the indoor meetings is an extremely important source of published records for all insect species. It is often the first place a record will appear in print, even if at a later date an expanded note appears elsewhere in the entomological literature.

I have been surprised to see the occasional citation of my name against an unfamiliar beetle record, only to discover upon closer examination that the original published source is the BENHS Annual Exhibition report on the Coleoptera for such and such a year for which I just happen to have been the 'recorder'. And herein lies the crux of a dilemma: to quote the recorder or the exhibitor of the beast in question.

The tasks of the recorder are manifold and yet often thankless. A sheaf of papers—many exemplary, some a disgrace, but most usually at least satisfactory—is dealt out to the duly named officials, whose task it is to produce a publishable record of the event. In some instances this requires complete revision of names and authors and careful editing out of superfluous material, yet in others it only requires verbatim reproduction.

But the main emphasis throughout the entire report is on individual records made by individual members, whether this be an unusual colour form or a species new to the country. So, if in a later published article reference is made to an exhibited specimen it seems a shame that it is not the original captor who is credited. I would suggest the following formats for such Annual Exhibition and Indoor Meetings citations:

Hodge, P. J. 1991 [*Acupalpus flavicollis* (Sturm) new to E. Sussex. Exhibit at BENHS Annual Exhibition 1990.] *Br. J. Ent. Nat. Hist.* **41**: 40.

Lees, D. C. 1991. [*Euriphene* sp. Exhibit at BENHS Annual Exhibition 1990]. *Br. J. Ent. Nat. Hist.* **4**: 34 and Plate 1, Figure 14.

Halstead, A. J. 1991. [Leaves of *Caltha palustris* L. damaged by *Leiosoma deflexum* (Panz.). Exhibit at BENHS Indoor Meeting 23 April 1991.] *Br. J. Ent. Nat. Hist.* **4**: 177.

Of course, there will always be the case where the citation will be to the recorder's comment and not necessarily to the exhibitor's specimen. Perhaps the form should then be:

Barrington, R. D. G. 1991. [Comment on exhibit by L. D. Young and N. B. Potter at BENHS Annual Exhibition 1990]. *Br. J. Ent. Nat. Hist.* **4**: 23.

With the 'modern' tendency to write in the third person it may not prove possible to distinguish between recorder and exhibitor, but whatever reference is made, 'Anon' is the least informative.

RICHARD A. JONES

Plate II. ANNUAL EXHIBITION 1992

1992 ANNUAL EXHIBITION
Imperial College, London SW7—31 October 1992

The following account of exhibits has been compiled by R. D. G. Barrington (British Butterflies), B. K. West (British Macrolepidoptera), J. M. Chalmers-Hunt (British Microlepidoptera), B. Goater (Foreign Lepidoptera), P. J. Chandler (Diptera), P. J. Hodge (Coleoptera), P. Kirby (Hemiptera), A. J. Halstead (Hymenoptera and other orders) and R. Dyke (Illustrations). The photographs for the two colour plates were taken by D. E. Wilson.

British Butterflies

Bailey, K. E. J.—(1) *Pararge aegeria* L. ab. *cockaynei* Goodson bred by giving overwintering larvae extra warmth in the early spring. A striking *Pyronia tithonus* L. ab. *crassi-excessa* Leeds, Devon 1992, a blackened variety of *Boloria euphrosyne* L. resembling ab. *edna* Lobb, Devon 1992 and a wild-caught *Argynnis lathonia* L., Devon, 1992.

(2) Further results from the exhibitor's inventive programme of temperature experiments. Many notable aberrations were shown including *Argynnis paphia* L. ab. *nigricans* Cosmovici on both type and f. *valezina* Esp. ground colour, and extreme forms of *Polygonia c-album* L. ab. *reichstettensis* Fettig (all produced by changing the larval daylength and cold-shocking the pupae). *Nymphalis polychloros* L. ab. *testudo* Esp. and *Apatura iris* L. abs *lugenda* Cab. and *iolata* Cab. (daylength change plus pupal heat-shock). A series of *Mellicta athalia* Rott. ab. *corythallia* Hübn. (larval cold-stress and pupal cold-shock) and a fine series of varieties of *Eurodryas aurinia* Rott. Ab. *virgata* Tutt was produced by a day-length change to the larvae and pupal cold-shock. A long series of the beautiful ab. *sebaldus* Schultz and intermediates was produced by developing early post-hibernation larvae rapidly under infra-red light and cold-shocking the pupa. This aberration (Plate II, Fig. 8) has the upperside markings streaked and often some are obsolete, and the outer half of the hindwing underside white. This form occasionally turns up in the field, usually when the species is very abundant, which often happens when the weather early in the year is unusually warm. The larvae develop rapidly and so escape the depredations of parasitic wasps.

Plate II. ANNUAL EXHIBITION 1992

1	2	3
4	5	6
7		8
9		10
11		12

1: *Anthocharis cardamines*, albino ab. *lasthenia*, bred, J. H. Payne. 2: *Boloria selene*, bred, A. M. Jones. 3: *Aricia agestis*, ab. *discoelongata*, bred, M. Callow. 4: *Celastrina argiolus*, bred, Dorking, Surrey, 13.ix.92, R. Crouthers. 5: *Polyommatus icarus*, male ab. *extrema*, high temperature shock as pupa, N. B. Potter. 6: *Lysandra coridon*, melanic mosaic, Dorset, 1992, G. D. Trebilcock. 7: *Argynnis aglaja*, Lulworth, Dorset, vii.92, B. Fensome. 8: *Eurodryas aurinia*, ab. *sebaldus*, infra-red and cold-shock, K. E. J. Bailey. 9: *Anthocharis cardamines*, mixed gynandromorph, Derbyshire, 29.iv.92, B. Elliott. 10: *Colias australis*, Langen am Arlberg, Austria, 18.viii.52, B. K. West. 11: *Colotis ione*, gynandromorph, Wyliespoort, N. Transvaal, 9.vi.56, B. K. West. 12: *Nothochrysa fulviceps*, Nagyoldal, Hungary, 28.viii.81, C. W. Plant.

Photo: D. E. Wilson

BARRINGTON, R. D. G.—*Eurodryas aurinia* Rott. a male ab. *virgata* Tutt bred in the F_2 from an original wild-caught male which was paired with a 'normal' female. It is a multifactorial form with a weakening effect (a number of the F_2 generation were unable to climb to expand their wings, and none would pair). A male with dark red markings, and a bred female ab. *praeclara* Kane with vivid and contrasting markings. *Coenonympha pamphilus* L. abs *obliquajuncta* Leeds and *caeca* Ober (three examples were taken in one locality in June 1992). *Pyronia tithonus* L. from the hedges in Dorset where they had an exceptional year in 1992, included a pair of ab. *crassipuncta* Leeds, a dark male ab. *obscurior* Schultz and a creamy-yellow female ab. *subalbida* Verity. From a North Dorset hay meadow, *Maniola jurtina* L. female abs *antiaurolancea* Leeds, *postmultifidus* Lipscomb, *pallidula* Leeds and a mixed gynandromorph having the right side male, the left forewing female and the left hindwing mixed. *Lysandra coridon* Poda male aberrations, ab. *discreta-postcaeca* B. & L. and *parallela-postcaeca* B. & L. and females ab. *confluens* B. & L. and *dextransformis* Leeds. A male *Pararge aegeria* L. ab. *saturatior* Cromb. and a male *M. jurtina* ab. *excessa* Leeds with two extra spots on each forewing and five on each hindwing, bred in the F_1 from a wild-caught female ab. *addenda* Mosley.

BUTTON, S.—A selection of *Lysandra coridon* Poda aberrations selected from 5000 insects examined in the field in Wiltshire and Dorset in 1992. Amongst various minor forms were a good gynandromorph having three wings male and one hindwing female with a streak of male coloration. Several ab. *striata* B. & L. of both sexes were shown, with inwardly streaking forewing spots and an example of the much rarer corresponding hindwing form ab. *postdiscoelongata* B. & L. A male with a very pale underside.

CALLOW, M.—A mixed gynandromorph of *Anthocharis cardamines* L. with orange blotching on both forewings, bred from wild-collected ova, Surrey 1992. An interesting breeding experiment from an original *Aricia agestis* D. & S. female having enlarged and outwardly displaced spotting. The F_1 was type and the F_2 of 99 insects contained only normal males and 20% female aberrations. The F_3 again produced only female aberrations. The stock has been inbred to the F_6 which was produced by pairing only aberrations from the F_5 (male aberrations appearing in the F_4 generation onwards) and contained 100% aberrations. Some of these were well developed with all spotting pushed up to the marginal lunules and the ground-colour very dark (Plate II, Fig. 3). It would seem that this is a recessive form more easily expressed in the female.

COLLINS, G.—A good male *Argynnis paphia* L. ab. *confluens* Spuler (Surrey, 18.vii.92) and a female f. *valezina* Esp. from Wiltshire. *Hipparchia semele* L. male ab. *monocellata* Lempke (Dorset 30.vii.92), a strong *Aglais urticae* L. ab. *semiichneusoides* Pronin, ab. *obsoleta* B. & L. forms of *Lysandra coridon* Poda and *Cupido minimus* Fuessly ab. *caeca* Courv.

EDMUNDS, H. A.—A very suffused *Argynnis aglaja* L. ssp. *scotica* Watkins from Mull, a series of the brightly marked *Maniola jurtina* L. ssp. *splendida* White from Jura, Iona and Mull. *Aphantopus hyperantus* L. from Jura. These were a little paler than the southern form and bore a resemblance to the Irish race. *Coenonympha tullia* L. ssp. *scotica* Staud. from Mull and Skye, and *Erebia aethiops* Esp. from Mull and the Cairngorms.

ELLIOT, B.—A mixed gynandromorph of *Anthocharis cardamines* L. affecting both sides, Derby 1992 (Plate II, Fig. 9).

ELSTON, MAJOR H. J.—*Coenonympha tullia* Müller, O. F. ssp. *scotica* Staud. from Skye, which were unusually heavily marked for this location. A male *Maniola jurtina* L. ssp. *splendida* White also from Skye. A pair of *Erebia epiphron* Knoch from Cumbria

taken during the only five minutes of sun on a very wet and windy day. *Plebejus argus* L. spp. *caernensis* Thompson and *Hipparchia semele* L. spp. *thyone* Thompson from Great Orme, Wales. *Lysandra coridon* Poda a female ab. *anticaeca* B. & L. and an upperside female with blue developing on the hindwings.

FENSOME, B.—A totally 'blind' female *Hipparchia semele* L. ab. *holonops* Brouwer, a form very rarely seen in the female. An attractive confluent aberration of *Argynnis aglaja* L. from Lulworth, Dorset, 1992, affecting mainly the outer markings (Plate II, Fig. 7). A watercolour painting of both surfaces of this insect, executed by the exhibitor, was also shown. Two unusual male aberrations of *Lycaena phlaeas* L. had the forewing spots small and inwardly streaked on both surfaces, and a male ab. *obsoleta* Tutt. A curious male *Gonepteryx rhamni* L. having the centres of all wings of the female coloration. Temperature-induced melanic forms of *Polygonia c-album* L., *Aglais urticae* L. and *Inachis io* L.

HARMER, A. S.—A gynandromorph of *Polyommatus icarus* Rott. from Orkney, being a basically female insect with a streak of male coloration at the apex of the left forewing.

JONES, A. M.—(1) A fine melanic *Argynnis paphia* L. ab. *nigricans* Cosmovici. Two bred homoeotic butterflies: a female *Thecla betulae* L. with a large patch of forewing underside reproduced on the underside of the left hindwing, and a male *Anthocharis cardamines* L. with a patch of apical orange on the underside of the left hindwing. A bred gynandromorph of *Quercusia quercus* L. with the left side mainly female but with two spots of male coloration in the border, and the right side a mosaic of both sexes. A good *Aglais urticae* L. ab. *semiichneusoides* Pronin (wild-caught 27.vi.92) with totally black hindwings and no lunules, and a strong example of ab. *pseudoconnexxa* Cab. A striking female albino of *Pyronia tithonus* L. ab. *albinotica* Goodson, taken from bramble, in which the fulvous markings are unchanged but all darker coloration is replaced by soft grey.

(2) Continued results of breeding from a lightly-marked *Boloria selene* D. & S. The original male (captured 28.vi.91) had the central markings on all wings reduced. It was paired with a typical female. The F_1 of 34 type insects emerged in July and August 1991 and the F_2 emerged in Sept/Oct 1991. This contained 16.5% aberrations. F_3 and F_4 generations bred only from aberrant parents produced 100% aberrations. Some of these were extreme forms with very reduced and obsolete dark markings (Plate II, Fig. 2). This would appear to be a recessive form. It resembles ab. *obsoleta* Curtis, but seems to be a different form as *obsoleta* entirely lacks many black markings, whereas, while the present form may lack some, others are often present, but ghostly. These aberrations are similar to those bred by K. E. J. Bailey in 1984 from larvae fed on violet sprayed with dimethyltyrosyne solution (which inhibits the formation of melanin). These were exhibited at the 1986 annual exhibition. Some F_4 insects from this stock have been outcrossed with type and the stock is being maintained.

KNILL-JONES, S. A.—A male example of the very rare *Polyommatus icarus* Rott. ab. *transparens* Tutt from Tennyson Down, Isle of Wight, 29.viii.92.

MACKENZIE-REID, I.—*Colias croceus* Geoff. (Cornwall 22.vii.92) which was paler than typical and had one small hindwing.

MACNULTY, B. J.—Butterflies from the Gower Peninsula, shown as part of an ongoing survey to cover all the Lepidoptera of the area. This included the 'skippers': *Thymelicus sylvestris* Poda, *Ochlodes venata* Br. & Grey, *Erynnis tages* L. and *Pyrgus malvae* L., and the lycaenids: *Quercusia quercus* L., *Satyrium* (formerly *Strymonidia*) *w-album* Knoch, *Callophrys rubi* L., *Lycaena phlaeas* L., *Cupido minimus* Fuessly, *Aricia agestis* D. & S., *Polyommatus icarus* Rott. and *Celastrina argiolus* L.

PATEMAN, J. AND CROUTHERS, R.—A very dark male *Celastrina argiolus* L. (Plate II, Fig. 4), one of two bred. *Pyrgus malvae* L. with dark ground-colour on the underside, some strongly marked *Pyronia tithonus* L. ab. *excessa* Leeds forms of both sexes, and some good examples of *Polyommatus icarus* Rott. ab. *discoelongata* B. & L. bred in the F_2 with the hindwing spotting also affected.

PAYNE, J. H.—Extreme forms of *Aglais urticae* L. and *Polygonia c-album* L. from temperature-shocked pupae. A male albino *Anthocharis cardamines* L. ab. *lasthenia* Mill. having the dark markings replaced by pale grey (Plate II, Fig. 1). This was bred by P. Batty in March 1992. A bred *Vanessa atalanta* L. with pale pathological streaks.

PICKLES, A. J. AND C. T.—A butterfly believed to be of the American genus *Eurema* ('sulphurs') found flying at Cradley Heath, W. Midlands at 2.30 pm on 6.vi.92 by Rex Harvey. Although probably a local release, enquiry has yet to establish the source.

PORTER, J.—A series of the single-brooded *Polyommatus icarus* Rott. from Scotland compared with the English form. The Scottish specimens were a little larger and brighter. A selection of aberrations taken in past years and in 1992. This included *Inachis io* L. ab. *belisaria* Ober. with blank hindwing eyespots, *Polygonia c-album* L. ab. *suffusa* Tutt, an *Apatura iris* L. resembling *A. ilia* L. due to extra orange scaling on the upperside of the hindwings, a mixed gynandromorph of *Gonepteryx rhamni* L. A rare form of *Argynnis aglaja* L. was ab. *albescens* Verity with creamy ground-colour. A fine male *Eurodryas aurinia* Rott. ab. *melanoleuca* Cab. taken some years ago on Hod Hill was typical of the recurrent forms that used to occur in that locality before mismanagement reduced the colony. A pale *Coenonympha pamphilus* L. ab. *aurea* Leeds, *Hipparchia semele* L. with pale yellow bands, *Cupido minimus* Fuessly approaching ab. *caeca* Courv. and *Coenonympha tullia* Müller, O. F. ssp. *scotica* Staud ab. *obsoleta* Tutt.

REID, J.—*Lysandra bellargus* Rott. ab. *krodeli* Gillmer.

REVELS, R. C.—(1) A halved gynandromorph of *Celastrina argiolus* L. of the spring brood. The exhibitor collected larvae of four successive broods to record changing percentages of parasites, from summer 1990 to spring 1992. From these broods, the percentage of parasited larvae was 7.7%, 64.8%, 66.8% and 99%. No larvae could be found at all for the summer 1992 brood. A classic picture of how parasites affect the well known cyclical fluctuations of this species.

A good male *Polyommatus icarus* Rott. ab. *alba-radiata* B. & L., captured wild in Beds., 1992, which was paired with two captive females. A male *Lycaena phlaeas* L. ab. *fuscae* Robson with very pale ground-colour, Beds., 1992, a *Pyronia tithonus* L. male ab. *pallidula* Leeds, Beds., 1992 and a male *L. phlaeas* L. with very heavy forewing borders bred in a summer brood of 100 normal insects.

(2) An F_1 brood from an unnamed aberration of *Pyronia tithonus* L. lacking the fulvous on the upperside of the hindwings (and the pale central band on the underside) and with heavy borders on both surfaces of the forewings (an example captured by B. Fensome in the same place was illustrated *Proc. Trans. Br. Ent. Nat. Hist. Soc.* **18**: pl.1). The brood consisted of 13 normal and 12 aberrations suggesting that this is a dominant form of which the parent was a heterozygote. Some of these aberrations were quite striking with deep brown-black hindwings. Survival in the F_2 larvae was reported as poor at the time of the exhibition.

TREBILCOCK, G. D.—The highlight of this exhibit of aberrations was one of the most remarkable forms of *Lysandra coridon* Poda to have been seen for many years (Plate II, Fig. 6). The righthand side was extreme black ab. *plumbescens* Tutt with the normal black margins barely visible on the hindwings, and the left side was a mixture of *plumbescens* and type coloration, so that superficially it resembled a gynandromorph. The underside was affected in much the same way. Other aberrations

included a strong female ab. *arcuata* Courv., a female *costajuncta* B. & L. and a male *antidiscoelongata-postcaeca* B. & L., two female *Hamearis lucina* L. ab. *gracilens* Derenne with reduced black markings, *Plebejus argus* L. ssp. *caernensis* Thompson, a strong *Pyronia tithonus* L. ab. *excessa* L. (Devon), *Maniola jurtina* L. showing homoeosis with a large splash of fulvous on the underside of the left hindwing and a possible bred gynandromorph of *Melitaea cinxia* L.

TUBBS, R. S.—Three drawers showing the results of the exhibitor's many years of breeding aberrations of *Lysandra coridon* Poda, beautifully laid out to illustrate the genetics of the various forms. Included were the blue female forms *tithonus* Meiger and *semisyngrapha* Tutt (both sex-linked recessives, but they are not connected forms), and *fowleri* South (a recessive). The latter was shown in combination with both the blue forms. These double varieties must be amongst the most lovely aberrations of British butterflies.

YOUNG, L. D.—Continued results of breeding *Polyommatus icarus* Rott. abs *discoelongata* B. & L. and *basielongata* B. & L. Some strong ab. *antiradiata* Courv. were shown, some also having good development of the *basielongata* characteristic. The hindwing spots were beginning to extend on a few specimens. The exhibitor is working on developing the hindwings to *radiata* in his breeding experiments, but hindwing spotting seems much more resistant to variation than that of the forewings. Seven insects were shown which were bred by Dr N. B. Potter from stock given by L. D. Young from the above strain. The pupating larvae were accidentally left in a closed greenhouse for several days during a hot spell in September 1991. The resulting adults included three ab. *extrema* B. & L., one (Plate II, Fig. 5) being about as far streaked as spot development can go, extending along all the interneural spaces (and so being similar to the 'Montgomery *striata*', thought to be the most developed form of *Lysandra coridon* Poda ab. *extrema* B. & L. on record: illustrated in *A monograph of the British aberrations of the chalk-hill blue butterfly* by Bright and Leeds). This interesting accident suggests that, like these bred insects, the excessively rare wild examples of *extrema* in *L. coridon* might also be produced by temperature acting on a pupa that would already have produced *radiata*.

BRITISH MACROLEPIDOPTERA

AGASSIZ, D. J.—*Eupithecia sinuosaria* Evers. taken by B. Slade at Berrow, Som., 13.vi.92, believed to be the first British specimen recorded; *Nola confusalis* H.-S. ab. from Redlynch, Wilts., i.vi.92 and *Eublemma ostrina* Hübn. first record for Essex, from Takeley, 25.viii.92.

BAKER, B. R.—Migrants 1992: *Mythimna loreyi* Dup. from Shaldon, Devon, 18.ix and East Prawle, Devon. 18–22.ix and *Heliothis armigera* Hübn. from there, 19.ix. Aberrations from Reading: *Biston betularia* L. with black forewings and white hindwings, 2.vi.82; *Melanchra persicariae* L. with extended reniform stigma, 9.vi.57 and a suffused *Hecatera bicolorata* Hufn., 3.viii.78. Also a melanic *Protodeltote pygarga* Hufn. from Pamber Forest, Hants, 7.vi.65.

BLAND, K.—*Anarta melanopa* Thunb. from Beinn Bham, West Ross (v.c. 105) at alt. 2000′, 27.v.92, and a request for records for West Ross, for which there are no recent ones.

CLANCY, S.—From Dungeness, 1992: *Thaumetopoea processionea* L., three male specimens, a species noted only once before in the British Isles; *Lymantria dispar* L. from Greatstone, 25.viii; two *Polia bombycina* Hufn. of the grey Continental form (also seen in 1989), *Mythimna loreyi* Dup., *Photedes elymi* Treit., the first specimens from Kent, an obsolete ab. of *Luperina testacea* D. & S. and *Eublemma ostrina*

Hübn. From Ashford, Kent, *Macdunnoughia confusa* Steph. 31.viii.92; a series of *Hylaea fasciaria* L. bred from a female taken at Lydd, Kent, 31.viii.92; *Hyles lineata livornica* Esp. from Dungeness, 25.v.92 and a female *Orthosia cruda* D. & S. having a black costal streak on the forewing, Hamstreet, Kent, 10.iv.92 (Plate III, Fig. 12).

CLARKE DR J.—Sesiidae bred in 1992: *Synanthedon andrenaeformis* Lasp., *S. culiciformis* L. from coppiced birch, including ab. *flavocingulata* Spuler and *S. tipuliformis* Cl., and stems illustrating larval workings for each species. Bred or taken in 1992: *Zygaena purpuralis* Brünn. and *Z. loti* D. & S. from Mull; *Hyles lineata* F. Swanage, 26.v; *Semiothisa brunneata* Thunb., Lingfield, Surrey, *Thera cupressata* Geyer from St Lawrence, I.o.W., *Miltochrista miniata* Forst. ab. *flava* Bigneau, Ashtead, Surrey, 28.vi and examples of summer and autumn broods of *Hypena obsitalis* Hübn. from Torbay, Devon.

CLASSEY, E. W.—From Uffington, Oxon., 1992: *Heliothis armigera* Hübn. 3.viii, *Mythimna vitellina* Hübn. 28.viii and 1.ix, and *Rhodometra sacraria* L. 22.v, 18.ix and 2.x.

COLENUTT, S.—Two *Mythimna loreyi* Dup. 25.v and 9.viii.92, *Earias clorana* L. 29.vi.92, *Eublemma ostrina* Hübn. 21.v.92, *Orthonama obstipata* F. 26.vi.92, *Hydriomena ruberata* Freyer 24.v.92, *Thera cupressata* Geyer 28.xi.91 and a melanic *Timandra griseata* Peters 31.vi.92, all from Chale Green, I.o.W.

COLLINS, G.—A female *Trigonophora flammea* Esp. Swanage, 12.x.91, and specimens bred from it.

COOK, R.—*Zygaena trifolii decreta* Verity ab. *lutescens* Cockerell from Bodmin, Corn., 6.vii.92, *Z. loti* D. & S. and *Z. purpuralis* Brünn. from Mull, vi.92. *Agrotis ripae* Hübn. bred from larvae, St Cyrus, Aberdeen; dark *Spilosoma lubricipeda* L. from Mull, vi.92; bred *Trichoplusia ni* Hübn., Portland, viii.92; *Dicycla oo* L. including ab. *renago* Haw., Ashford, Surrey and a bred series of *Mythimna loreyi* Dup. from a female taken at Wimborne, Dorset, 18.viii.92.

CRONIN, A. R.—A selection of moths bred or caught in 1992 which included a female *Ennomos autumnaria* Wern.

DAVEY, P.—Probable immigrants to Dorset in 1992 included: *Cyclophora puppillaria* Hübn., Durlston, 8.viii; *Hyles lineata* F. *livornica* Esp., St Aldhelm's Head, 23.v; *Mythimna loreyi* Dup., Gaunt's Common, 18.viii, and a series bred from this specimen; *Eublemma ostrina* Hübn. from St Aldhelm's Head, 27.v; *Macdunnoughia confusa* Steph., Gaunts Common, 28.viii and *Trichoplusia ni* Hübn. from St Aldhelm's Head, 7.viii.

ELLIOTT, B.—Obtained in 1992: *Trichoplusia ni* Hübn. bred from a larva found on *Hieracium*, Burren, Co. Clare; *Hadena luteago barrettii* Doubl. from pupae, S. Devon; *Parasemia plantaginis* L. from ova from Rannoch Moor and *Hemaris tityus* L. bred from larvae, Co. Kerry. Also a fine ab. *albescens* Cockerell of *Opisthograptis luteolata* L., one of two seen at Leigh South, Co. Galway; *Ematurga atomaria* L. ab. *unicolaria* Staud. from W. Yorks. and an extreme form of *Aspitates ochrearia* Rossi from Dungeness, 1990 (Plate III, Fig. 7).

ELSTON, MAJOR H.—Included were series of *Zygaena purpuralis* Brünn. and bred specimens of *Z. lonicerae jocelynae* Trem. from the Isle of Skye, 1992; also bred specimens of *Euproctis chrysorrhoea* L. from Fulham, London, where larvae were common in 1992.

EMMET, A. M.—Immigrants in 1992 to Saffron Walden, Essex: *Hyles lineata livornica* Esp. 9.viii and *Mythimna vitellina* Hübn. 25.ix. Species new to N.W. Essex were *Ennomos quercinaria* Hufn. (rare in Essex), *Eumichtis lichenea* Hübn., normally coastal in Essex and a bred series of *Eupithecia millefoliata* Rössl. from Suffolk, previously not recorded from Suffolk.

GILL, N.—From the Shetland Islands, July 1992, *Hepialus humuli thulensis* Newman, *Apamea zeta marmorata* Zett., *Diarsia mendica thulei* Staud., *Camptogramma bilineata atlantica* Staud., *Xanthorhoe munitata hethlandica* Prout and *Perizoma albulata subfasciaria* Boh.

HALL, N.—From Hastings, Sussex, 1992, *Minucia lunaris* D. & S. at sugar, 24.v, *Noctua pronuba* L. a dark ab. with almost obsolete stigmata, 24.vii, *Tetheella fluctuosa* Hübn. ab. *unicolor* Lempke 24 and 25.vii, *Acronycta alni* L. ab. *suffusa* Tutt 24.v and *Euphyia biangulata* Haw. 25.v and 31.vii. Also *Actebia praecox* L. 24.vii and *Eilema pygmaeola* Doubl. 31.vii, unlikely to be of local origin, although they occur 10 to 20 miles away.

HARBOTTLE, A.—A gynandrous *Lasiocampa quercus* L. (Plate III, Fig. 5) bred from a female taken Eastbourne, 10.viii.91, emerged 17.viii.92, appearing to be male, but body female which laid two colourless eggs which soon collapsed.

HARMAN, T.—Specimens obtained in 1992: *Semiothisa signaria* Hübn. from Dover, 1.vi (two) and Kingsgate, Kent 29.v; *Abrostola trigemina* Wern. from Kent, 25.viii and 26.ix; *Mythimna loreyi* Dup. from Bucks. 8.viii and *Heliothis armigera* Hübn., Kent, 19.ix and 18.x.

HAYWARD, R.—From Slough, Bucks., in 1992 a bred series of *Idaea emarginata* L.; *Mythimna vitellina* Hübn. 18.ix; bred *Polymixis flavicincta* D. & S.; an unusually dark *Cryphia domestica* Hufn. and a fine ab. of *Charanyca trigrammica* Hufn. 5.vi (Plate III, Fig. 1).

HENWOOD, B.—A larva of *Mythimna loreyi* Dup. from a female taken at Abbotskerswell, Devon, 1992; also from there *M. vitellina* Hübn., *Orthonama obstipata* F. and *Idaea vulpinaria* H.-S. in 1992.

HIPPERSON, D.—*Zygaena trifolii decreta* Verity from two marshy heathland sites near the Norfolk coast (identity of moths confirmed by W. Tremewan). A specimen of *Minucia lunaris* D. & S. from East Winch Common, Norf., 30.v.92 and *Eublemma ostrina* Hübn. from Bishop's Waltham, Hants, 8.viii.92.

HOARE, R.—*Eublemma ostrina* Hübn. from larvae found on basal rosettes, stems and seed heads of *Carlina vulgaris* at Brea Hill, Rock, Corn., 8.vii.92, moths emerging 1–5.viii.92, these thought to be the first *E. ostrina* larvae to be found in the British Isles.

KOLAJ, A.—A selection of migrant species taken during 1992 including the tenth British record for *Ctenoplusia limbirena* Guen. from Swanage, Dorset, 7.ix., also a female *Crocallis elinguaria* L. having the marginal area of the forewing rayed with blackish-brown (Plate III, Fig. 18).

JENKINS, A.—The exhibit included *Perconia strigillaria* Hübn. from Thursley Common, showing variation; two *Hyles lineata livornica* Esp. from Chardstock, Devon, 14.v.92 and the Lizard 19.viii.92; *Heliothis viriplaca* Hufn. from Lakenheath; a bred series of *Scopula nigropunctata* Hufn. from Folkestone, July 92; *Mythimna loreyi* Dup. from the Lizard, 19.viii.92 when over a hundred were seen; *Bupalus piniaria* L., Richmond Park 6.vi.92 showing variation and *Aspitates ochrearia* Rossi from Lakenheath showing variation.

KNILL-JONES, S.—A comprehensive exhibit of moths taken mainly at Freshwater, I.o.W. in 1991 and 1992. In 1992 of especial note were *Earias insulana* Boisd., fourth British record, and the first for the I.o.W., 26.vi. Other interesting specimens were *Eilema caniola* 20.ix also new for the I.o.W.; *Lacanobia oleracea* L. ab. dark brown with white hindwings, 29.viii; *Elaphria venustula* Hübn. 13.vi, new to the I.o.W.; *Conistra ligula* Esp. ab. with white margin, 6.ii; *Drymonia ruficornis* Hufn. ab. with pure white central band, 18.iv and *Rhodometra sacraria* L. 11.viii and another specimen from Newtown, I.o.W. and *Eublemma ostrina* Hübn. f. *carthami* H.-S. 26.viii. Also a bred series of *Cyclophora linearia* Hübn. showing variation, moths

emerging December 91 to January 92; *Mythimna unipuncta* Haw. 27.xii.91, a very late date and *M. l-album* L. ab. lacking the l-mark, 23.xi.91.

Langmaid, Dr J.—*Euplagia quadripunctaria* Poda ab. *lutescens* Staud. from Portland, 8.viii.92; *Malacosoma neustria* L. ab. with reduced median fascia, Southsea, Hants, 8.vii.92 and *Calophasia lunula* Hufn. from Southsea, 11.viii.92, the second Hampshire record.

Lowe, Dr N.—Moths from Breconshire included *Scopula ternata* Schr., *Euphyia biangulata* Haw., *Eupithecia inturbata* Hübn., *E. dodoneata* Guen., *Archanara dissoluta* Treits., *Chilodes maritimus* Tausch. and *Syngrapha interrogationis* L.

McCormick, R. and Penney, C.—A comprehensive exhibit which included: *Cossus cossus* L., Stonelees, Kent; *Adscita statices* L. from Odiham, Hants; *Sesia bembeciformis* Hübn., Blindley Heath, Surrey; *Catarhoe rubidata* D. & S. from Ham Fen and Stonelees, Kent; *Eupithecia phoeniceata* Ramb. from Pagham, Sussex; *Eilema sericea* Gregs. from Dinas, near Harlech; *Hadena caesia* D. & S. from Ardnamurchan Point, Inv.; *Philudoria potatoria* L. ab. *bicolor* Lempke from Stonelees (Plate III, Fig. 16); *Lampropteryx otregiata* Metc. having the dark central band of the forewing accentuated by whiter-than-normal outer lines, from Dinas, Gwynedd, 5.viii.92 (Plate III, Fig. 4); a very pale form of *Lomaspilis marginata* L. from Ham Fen; *Euproctis similis* Fuess. ab. *nyctea* Staud. from Hendre, Gwynedd, and *Lacanobia oleracea* L. ab. with elongated brown eyes, Pagham, Sussex.

McNulty, Dr B.—Moths from the Gower Peninsula included: *Stauropus fagi* L., *Hemaris fuciformis* L., *Deilephila porcellus* L., *Mimas tiliae* L., *Sphinx ligustri* L., *Acherontia atropos* L. and *Agrius convolvuli* L.

Nash, S.—From Fernham, Oxon. in 1992: *Trichoplusia ni* Hübn. 19.viii.; *Eublemma ostrina* Hübn. 21.viii.; *Mythimna loreyi* Dup. 16 and 26.ix; *M. vitellina* Hübn. 26.viii–2.ix (15); *Agrius convolvuli* L. 28.viii; *Rhodometra sacraria* L. 22.v–29.ix (8), and a melanic *Hada nana* Hufn. 20.vi.

Parker, M. J.—A specimen of *Euplagia quadripunctaria* Poda from Burton Bradstock, Dorset, 31.vii.92, one of several encountered in the area suggesting the existence of a Dorset colony.

Parsons, M.—Two *Chrysodeixis chalcites* Esp. from Littlehampton, W. Sussex, 14.x.91, and examples of a bred first generation. *Eilema pygmaeola pallifrons* Zell. bred from larvae from under stones and other debris, Dungeness, June 92; *Senta flammea* Curt., Ninfield, E. Sussex, and two abs of *Arctia villica* L. (Plate III, Fig. 17) and a pale *A. caja* L., all from Dungeness.

Phillips, J. W.—Specimens included *Hadena luteago barrettii* Doubl. from Slapton Sands, Devon, 1991/2; *Sideridis albicolon* Hübn. and *Agrotis ripae* Hübn. from Hayling Island, Hants; *Lycia zonaria* D. & S. bred from larvae, Iona, 1991/2; *Zygaena purpuralis* Brünn. and *Z. lonicerae jocelynae* Trem. from Skye, 1992; *Z. filipendulae stephensi* Dup. from Hayling Island and Skye, and an *Agrotis exclamationis* L. ab. lacking forewing markings, Havant, Hants, 1988.

Pickles, A. J. and C. T.—*Acherontia atropos* L., Lymington, Hants, 14.ix.92; *Hadena luteago barrettii* Doubl. bred from *Silene maritima* roots, Guernsey, and some Cornish specimens; *Agrotis ripae* Hübn. bred from a larva taken in Guernsey, 1991; *Calliteara pudibunda* L. ab. *obscura* Lempke and *Hydrelia flammeolaria* Hufn. ab. *confluens* Hoffman from Winchester; *Diarsia mendica orkneyensis* Byt.-Salz and *Xanthorhoe munitata* Hübn. from Orkney, and *Hypena obsitalis* Hübn. from larvae found on pellitory of the wall, S. Devon, August.

Reid, J.—Specimens of *Mythimna vitellina* Hübn., *M. albipuncta* D. & S., *Rhodometra sacraria* L. and *Luperina dumerilii* Dup.

Riley, A. and Townsend, M.—A large exhibit of aberrations and rarities, mainly

from the Rothamsted insect survey. It included from Harpenden, *Semiothisa signaria* Hübn., *Euphyia unangulata* Haw. and *Eupithecia sinuosaria* Evers. 21.vi.92 (Plate III, Fig. 3). Also several abs of *Idaea aversata* L. from various localities, *E. phoeniceata* Ramb. ab. from St Martins, Guernsey, 21.viii.90, *E. abietaria* Goeze ab. from larvae, Hamsterley Forest, Northumb., emerged May 1988, *Spargania luctuata* D. & S. melanic ab. from Warehorne, Kent, 4.viii.90 (Plate III, Fig. 14), *Lomospilis marginata* L. asymmetrical ab. from Keilder, Northumberland, 26.vi.88 (Plate III, Fig. 15), *Coenocalpe lapidata* Hübn. ab. Lairg, Sutherland, 27.ix.90, *E. ultimaria* Boisd. from Bishop's Stortford, Herts. 20.vi.89, *Costaconvexa polygrammata* Borkh. from Trinity, Jersey, 25–28.viii.84 and an extreme melanic *Peridea anceps* Goeze, Rowardennan, Stirling, 25.v.90.

ROUSE, T.—Several *Rhodometra sacraria* L. from Dungeness, September 1992, *Cyclophora puppillaria* Hübn., Densole, Kent, 27.ix.92, and larvae of this species being reared on *Myrtus communis*.

SCANES, J. S.—From Caister, Norfolk: *Photedes elymi* Treits., *Mythimna litoralis* Curt. and *Agrotis vestigialis* Hufn. 19–24.vii.92. From the Wye Valley *Euphyia biangulata* Haw. From Caswell Bay, Gower Peninsula, 7 and 8.viii.92 *Trichoplusia ni* Hübn., *Autographa gamma* L. ab. *nigricans* Spuler, *M. vitellina* Hübn. and *Heliothis armigera* Hübn., also *Hyles lineata livornica* Esp. Winchester, 23.v.92.

SIMMONS, M.—From Crowborough, Sussex, in 1992, *Heliothis peltigera* D. & S. 25.v and 29.ix, *Mythimna vitellina* Hübn. 18.ix and 28.ix, *Spodoptera exigua* Hübn. 15.v and 23.vii and a pale form of *Acronicta rumicis* L., *Calophasia lunula* Hufn. 24.v and 2.viii, migrants from the Sussex coast or Continent, or locally bred, although yellow toadflax has not been noted. Also *Trichoplusia ni* Hübn. from Pevensey, E. Sussex, 23.vii.92.

SIMSON, BRIG. E. C.—Two series of *Ennomos erosaria* D. & S. to compare those taken 1 to 26.vii and between 13.viii and 9.ix, the latter being darker. Also four *Trigonophora flammea* Esp. bred from eggs, and series of *Eupithecia denotata* Hübn. and ssp. *jasioneata* Crewe, to illustrate differences.

SKINNER, B.—Specimens of *Eublemma ostrina* Hübn. and the fourth British record for *Heliothis nubigera* H.-S. (Plate III, Fig. 8) from Swanage, Dorset, 14.v.92. Four *Hyles lineata livornica* Esp., v.92, also from Swanage. *Eilema griseola* Hübn. ab. with outer part of forewing normal and inner part straw coloured as in ab. *stramineola* Doubl. On behalf of W. Kittle the third *Earias insulana* Boisd. (Plate III. Fig. 9) for the British Isles, from St Austell, Corn. 13.vi.92. With B. Elliott a bred series of *Eublemma ostrina* Hübn., including an extreme example of f. *carthami* H.-S. (Plate III, Fig. 10), Burren, Co. Clare and Inisheer, Aran Islands, Co. Galway, from carline thistle flower heads in August, 1992, and photographs.

STERLING, COL. D. H., DR P. AND M. J.—*Zygaena exulans* Hohen., Aberdeenshire, vii.92; bred second generation *Scopula nigropunctata* Hufn. from a female taken at Folkestone, vii.92; *Pareulype berberata* D. & S. from Hampshire larvae off *Berberis vulgaris* L., and a photograph of the locality; *Mimas tiliae* ab. *obsoleta* Clark, Winchester, 11.vi.92; *Hyles gallii* Rott. from East Stratton, near Winchester, 8/9.vi.92; *Mythimna loreyi* Dup., 27/28.viii.92 and *Trichoplusia ni* Hübn. 28/29.vii and 31.vii/1.viii.92, all from Winchester.

TREMEWAN, W.—From Truro, Corn., *Lithophane leauteri hesperica* Boursin, 19.x.92, a new locality record. *Xanthorhoe fluctuata* L. ab. *costovata* Haw. a rare ab. in which the median band of forewing is absent.

WARING, DR P.—Interesting records from the Peterborough area in 1992: *Eilema sororcula* Hufn. from Castor Hanglands, Northants. 29.v, the first recent record; *Tyta luctuosa* D. & S. 23.v–30.vii; *Xylena vetusta* Hübn., Castor Hanglands, 28.ii; *Heliothis*

viriplaca Hufn. at actinic light, Peterborough, 29.vi; *Synanthedon myopaeformis* Borkh. from Peterborough, 2.viii; *Hyles lineata livornica* Esp. Castor Hanglands, 22.v. Also *Paraleupe berberata* D. & S. from Kidlington, Oxon. 23/24.vi.79.

WEDD, D.—A comprehensive and interesting exhibit which included from W. Ireland *Calamia tridens* Hufn. which was very common in the Burren in 1992; *Archanara algae* Esp. from coastal Loch Baile Ui Mhaelachain and Loch Baile Iochtair; *A. geminipuncta* Haw., perhaps the second Irish record; *Heliothis peltigera* D. & S. bred from larvae on *Calendula* at Kilnaboy, Co. Clare and Limerick; *Eublemma ostrina* Hübn., *Gnophos obfuscatus* D. & S., *Aporophyla lutulenta luenebergensis* Frey., *Schrankia costaestrigalis* Steph. and bred *Eriogaster lanestris* L. from the Burren. From the Marlow area of Bucks., three generations in one year of bred *Parascotia fuliginaria* L. *Xanthorhoe biriviata* Borkh. and *Photedes fluxa* Hübn. from Stonor, *Eupithecia denotata* Hübn. from larvae off ornamental *Campanula* in Marlow, *Cucullia lychnitis* Ramb., *Simyra albovenosa* Goeze, second record for the area, *Mythimna unipuncta* Haw., *M. obsoleta* Hübn., *Agrotis vestigialis* Hufn. from Marlow Common, new for the area, and *Autographa bractea* D. & S. from Marlow.

YOUNG, D.—In 1992 *Dicycla oo* L., Burghfield Common, Berks., 26.vi; *Agrotis ripae* Hübn. from Hayling Island, 31.v; *Heliothis armigera* Hübn., Burghfield Common, 6.viii; bred *Lycia zonaria* D. & S. from Iona; *Zygaena purpuralis* Brünn. from Skye; *Z. exulans* Hohen. from Braemar; *Z. lonicerae jocelynae* Trem. from Skye and bred *Ennomos autumnaria* Wern. from a female at Dungeness, 21.ix.91.

BRITISH MICROLEPIDOPTERA

AGASSIZ, CANON D. J. L.—*Tebenna micalis* Mann, three bred from *Pulicaria*, Gower, S. Wales, larvae taken 19–20.viii.92.

BAKER, B. R.—The following taken or bred from Berkshire v.c.22 in 1992. *Bucculatrix thoracella* Thunb. Forbury Gardens, Reading, 4.viii.92, imagines common on trunks of *Tilia × vulgaris* Hayne. *Phyllonorycter comparella* Dup. Moor Copse N.R., mines on *Populus × canescens* (Aiton) Smith, 10.ix.92, moths bred 22.ix.92; this confirms an observation of an empty mine on 15.viii.90 by J. Robbins and C. Bleazard. *Reuttia subocellea* Steph., The Holies, Streatley, larvae 12.i.92, moths bred 25.vi.92. *Acleris boscana* F. Ufton Park, pupa on *Ulmus glabra* Hudson, 1.x.91, moth emerged 6.x.91. *Homoeosoma sinuella* F., a specimen 'with suffused wings', Moor Copse N.R. 18.vi.92.

BEAUMONT, H. E.—*Biselachista albidella* (Nyl.), West Melton, S. Yorks., 16.vii.1992, first v.c.63 record. *Cosmiotes consortella* (Staint.), Wath Wood, S. Yorks., 10.viii.1990, first Yorkshire and v.c.63 record. *Argyresthia glaucinella* Zell., Wath Wood, S. Yorks., 26.vi.1992, a scarce or overlooked moth in Yorkshire, this is only the second record in forty years. *Ptycholomoides aeriferanus* (Herr.-Schäff.) Cottingham, Hull, E. Yorks., 8.vii.1992 (P. A. Crowther), first Yorkshire and v.c.61 record. *Lozotaeniodes formosanus* (Gey.), South Cave, E. Yorks., 25.vii.1992, (D. B. Cutts); Cottingham, E. Yorks., 27.vii.1992, (P. A. Crowther), first Yorkshire and v.c.61 record. *Eucosma lacteana* (Treits.), Spurn, E. Yorks., 17 & 20.vii.1991, (B. R. Spence), first Yorkshire and v.c.61 record. *Pammene aurantiana* (Staud.) Edlington Wood, S. Yorks., 9.viii.1991, first Yorkshire and v.c.63 record. *Scoparia ancipitella* (La Harpe), Edlington Wood, S. Yorks., 29.vi.1990, although there are old records from this and other Yorkshire localities this is the first Yorkshire record since 1920. *Ostrinia nubilalis* (Hübn.) Spurn, E. Yorks., 6.vii.1991 (B. R. Spence), first Yorkshire and v.c.61 record. *Phlyctaenia perlucidalis* (Hübn.), West Melton,

S. Yorks., 3.vii.1992, this moth has been recorded sparsely but regularly in Yorkshire (vice-counties 61 and 63) in recent years. *Endotricha flammealis* (D. & S.), Spurn, E. Yorks., 24.vii.1991 (B. R. Spence), first Yorkshire and v.c.61 record. Two further moths were recorded at Spurn in 1992. *Numonia suavella* (Zinck.), Spurn, E. Yorks., 29.vii.1992 (B. R. Spence), first Yorkshire and v.c.61 record. *Oxyptilus parvidactylus* (Haw.), South Cave, E. Yorks., 25.vi.1992, (D. B. Cutts), this record from v.c.61 reinstated this moth on the Yorkshire list, previously there was only a single unconfirmed record from Scarborough (v.c.62) in the middle of the nineteenth century. *Oxyptilus distans* (Zell.) Spurn, E. Yorks., 23.viii.1992 (B. R. Spence), first Yorkshire and v.c.61 record.

BLAND, DR K. P.—(1) Species new to the Outer Hebrides (v.c.100). *Stigmella salicis* Staint., a single vacated mine on *Salix aurita* L., Alioter (grid ref. NF8873), N. Uist, 18.vii.92. *Biselachista serricornis* Staint., one, Loch Iadaidh (grid ref. NF 8970), N. Uist, 17.vii.92. *B. eleochariella* Staint., Malaclete (grid ref. NF7973), N. Uist, 11.vii.92. *Pleurota bicostella* Clerck, Langass Burial Cairn (grid ref. NF8365), N. Uist, 16.vii.92. *Scrobipalpa artemisiella* Treits., many disturbed from thyme at Newton-ferry (grid ref. NF8978), N. Uist, 18.vii.92.

(2) Species new to Scotland. *Stigmella prunetorum* Staint., Near Lanark (grid ref. NS8644), Lanarkshire (v.c.77), vacated and occupied mines in blackthorn found by R. P. Knill-Jones and K. P. Bland, 5.ix.92; *S. prunetorum*?, vacated mines on hazel nearby.

(3) A second site in Scotland. *Phalonidia manniana* F.v.R. Morenish Meadows SSSI (grid ref. NN6035), Perthshire (v.c.88), moth emerged 30.v.92 from larvae in terminal shoots of *Mentha* sp. 27.vii.91; previously recorded from v.c.85.

(4) A second British specimen and resident status confirmed. *Callisto coffeella* Zett. Coire Fee (grid ref. NO2474), Glen Doll, Angus (v.c.90), moth emerged 14.v.92 from cocoon found on *Salix* twig 7.iv.92. Loch Kander, Glen Callater (grid ref. NO1981), S. Aberdeenshire (v.c.92), larval workings of *C. coffeella* in *Salix myrsinifolia* Salisb. (= *nigricans* Smith).

BRITTON, M. R.—*Phyllonorycter tenerella* Joannis, Tonbridge, Kent, *P. quinnata* Geoff., Tonbridge, Kent, *P. spinicolella* Zeller, Stain Dale, Yorkshire, *P. blancardella* F., Dunnington, York, Yorkshire, *P. oxyacanthae* Frey, Stain Dale, Yorkshire. *P. quinqueguttella* Stainton, Strensall Common, Yorkshire, *P. salicicolella* (?) Sircom, Tonbridge, Kent, *P. junoniella* Zeller, Bridestones, Yorkshire, *P. cavella* Zeller, Tonbridge, Kent, *P. hilarella* (?) Zeller, Skipwith Common, Yorkshire, *P. coryli* Nic., Tonbridge, Kent, Stain Dale, Yorkshire, *P. tristrigella* Haw., Tonbridge, Kent, Malton, Yorkshire, *P. stettinensis* Nic., Dunnington, Yorkshire, *P. froelichiella* Zeller, Stain Dale, Yorkshire, *P. nicelli* Stainton, Tonbridge, Kent, Stain Dale, Yorkshire, *P. kleemannella* (?) F., Dunnington, Yorkshire, *P. corylifoliella* Hübn., Tonbridge, Kent, *P. comparella* Dup., Pangbourne, Berkshire, *P. acerifoliella* Zeller, Tonbridge, Kent, *P. geniculella* Ragonot, Dunnington, Yorkshire, on sycamore bole.

CLANCY, S. P.—Species taken in Dungeness area in late 1991 and during 1992. *Eudonia lineola* Curtis, Greatstone, July/early August 1992, two of at least seven taken, *Margaritia sticticalis* L. Greatstone, small male taken 13.ix.92, *Sitochroa palealis* D. & S., Dungeness, 24.vii.92, New Romney, 24.vii.92, *Sciota adelphella* F.v.R., two of the six adults taken in the area during 1992; specimens were taken at Dungeness, Lydd, New Romney, and the species was bred from a female taken at New Romney, *Acrobasis tumidana* D. & S. Greatstone, two taken early August 1992; a third taken Dungeness, 17.viii.92. *Ephestia figulilella* Gregson, Dungeness, one taken 9.x.91.

COLENUTT, S.—*Ancylosis oblitella* Zeller, Chale Green, I.o.W., 23.vi.92; *Uresiphita polygonalis* D. & S., Chale Green, 19.ix.92.

COOK, R. R.—*Evergestis extimalis* Scop., Kimmeridge, Dorset, 9.viii.92.

DAVEY, P.—The following all taken at light in south-eastern Dorset in 1992. *Evergestis extimalis* Scop., Durlston, 10.ix, *Hellula undalis* F., Gaunts Common, 19.ix, *Margaritia sticticalis* L., St Aldhelm's Head, 7.viii., *Paracorsia repandalis* D. & S., St Aldhelm's Head, 27.ix, *Ostrinia nubilalis* Hübn., Gaunts Common, 17.ix, *Sitochroa palealis* D. & S., Durlston, 30.vii, *Mecyna flavalis* D. & S., Gaunts Common, 30.vii, *Palpita unionalis* Hübn., St Aldhelm's Head, 27.ix.

ELLIOTT, B.—*Crambus ericella* Hübn., Rannoch Moor, 1992; *Udea uliginosalis* Curt., Perthshire, 1992; *Microstega pandalis* Hübn., Co. Clare, 1992: *Oidaematophorus lithodactyla* Treits., Derbyshire, larvae, moth bred, 1992; *Ectomyelois ceratoniae* Zeller, bred from larvae found mining in pomegranates bought in Hampshire; *Cryptoblabes gnidiella* Mill., from larvae found mining in old corollas of pomegranates from Israel, purchased in Derbyshire.

EMMET, LT COL. A. M.—Updated distribution maps of the Coleophoridae showing an increase of 974 vice-county records mainly due to the submission of records by members of the Society since the maps were first shown in 1988. Also statistical maps and tables showing the scale of recording in each vice-county.

Species new to north-west Essex. *Stathmopoda pedella* (L.) Saffron Walden, 23.vii.92. *Adoxophyes orana* F. R. Saffron Walden, 7.viii.92.

A selection of Coleophoridae from the 58 species studied in their early stages in 1992 to complete the descriptions given in MBGBI Vol. 3, now in preparation. *C. alnifoliae* Barasch, Petts Wood, Kent, 7.vii.92, from cases sent by D. O'Keeffe, together with notes on the irregular timing of the early stages in the group to which the species belongs. *C. trigeminella* Fuchs Red Lodge, Suffolk, 7.vi.92, new to Suffolk. *C. ahenella* Hein. Bulford, Wilts, three vi.92, from cases received from M. Smith. *C. frischella* (L.) specimens reared vii–viii.92 from north-west Essex and Cambridgeshire (new to that county) from seed-heads of white clover (*Trifolium repens* L.). Possibly the first to be reared in Britain or even Europe. With notes. *C. ochrea* (Haw.) Meopham, Kent, from cases sent by D. O'Keeffe, 1.viii.92. *C. vibicella* (Hübn.) Beaulieu, Hampshire, vii.92. *C. saturatella* Staint. Beaulieu, Hampshire, vii.92. *C. niveicostella* Zeller Shrewton, Wiltshire 19.vii, 4.viii.92. The case is hard to find and two adults emerged though only one case had been detected. *C. linosyridella* Fuchs Canvey Island, Essex, vii.92. Three unidentified species from Saffron Walden were also shown.

FAIRCLOUGH, A. J. AND R.—Six drawers of *Acleris cristana* D. & S., bred or collected over the last 30 years. These contained 117 of the 135 named forms with a few forms awaiting names.

FOSTER, A. P.—*Pyrausta sanguinalis* L., a single example from Port Stewart, Co. Londonderry, where it was common in dune slacks during a National Trust Biological Survey.

HART, C.—*Stenoptilia islandicus* (Staud.). In 1954 on the slopes of Ben Lawers, Vine Hall captured a series of plume moths thought to be a form of *Stenoptilia bipunctidactyla*. The series was presented to the British Museum (Natural History) in 1967.

In 1988 the moths were identified by Christian Gibbeaux as belonging to *Stenoptilia islandicus* and therefore new to the British list. Gibbeaux states that the species is known from Iceland, Greenland and Finland, so the Scottish record represents an interesting southern extension to its known range.

In June and July 1992 the exhibitor spent over a week in Scotland searching for this moth, finally finding just two specimens at about 800 metres (2600′) on the slopes of an adjacent mountain, Meall nan Tarmachan, at a spot suggested by Bernard Skinner.

HECKFORD, R. J.—*Ischnoscia borreonella* (Millière) Portland, Dorset 8.viii.92 (with Dr J. R. Langmaid). *Caloptilia rufipennella* (Hübn.) Guernsey, Channel Islands bred from *Acer pseudoplatanus* L. 2–10.ix.92. New to Channel Islands. *C. leucapennella* (Steph.) Guernsey, Channel Islands bred from *Castanea sativa* Miller 8 & 10.ix.92. Previously unrecorded foodplant. *Phyllocnistis xenia* Hering, Budleigh Salterton, Devon bred from *Populus × canescens* (Aiton) Smith 10.x.92 (with *P. unipunctella* (Steph.) for comparison). New to Devon; previously recorded only from Kent. *Tebenna micalis* (Mann) Chelson Meadow, Plymouth bred 11.viii.92; Plympton, Plymouth bred 11–13.viii.92; Heybrook Bay, Devon bred 17.viii.92. All from *Pulicaria dysenterica* (L.) Bernh. Plympton, Plymouth at light 9.ix.92, first such record for this diurnal species. Plympton, Plymouth bred 6 & 7.x.92, first record in the British Isles of a second brood. *Coleophora serpylletorum* Hering Kennack Sands, Cornwall bred from *Thymus polytrichus* A. Kerner 10–20.vi.92 with 2 specimens bred from same foodplant 7 & 9.vii.1986 Poldhu Cove, Cornwall for comparison, the latter having almost unicolorous buff forewings. *Schiffermuelleria subaquilea* (Staint.) Haytor, Devon 31.v & 7.vi.92. New to v.c.3. *Amphisbatis incongruella* (Staint.) Haldon Hill, Devon 16.iv.92. New to Devon. *Anarsia lineatella* Zell. local shop, Plympton, Plymouth bred from nectarine 16.x.91. *Brachmia lutatella* (H.S.) Portland, Dorset 8.viii.92 at light (with Dr J. R. Langmaid). *Selenia leplastriana* (Curt.) Winspit, Dorset bred from *Brassica oleracea* L. 13–21.vi.92. *Cydia molesta* (Busck) local shop Plympton, Plymouth bred from Spanish plums 14–24.vii.92. *C. prunivorana* (Rag.) Plympton, Plymouth (exhibitor's garden) 20, 21 & 27.vi.92 at light. Ninth to eleventh British specimens. *C. coniferana* (Ratz.) Sned Wood, Herefordshire bred from *Pseudotsuga menziesii* (Mirbel) 17.v.92. Previously unrecorded foodplant. *Apomyelois bistriatella neophanes* (Durr.) Bicton Common, Devon bred from *Daldinia* on burnt gorse 21 & 24.v.92.

HOARE, R. J. B.—*Etainia louisella* Sircom, Chudleigh, Devon (v.c.3), ex larva descending from *Acer campestre* L., 8.v.92; *Trifurcula eurema* Tutt, Teg Down, Winchester, Hants (v.c.11), ex larva on *Lotus corniculatus* L., early ix.91; *Stigmella aceris* Frey, near Teg Down, Winchester, Hants (v.c.11), on *Acer campestre* leaf, 10.ix.92; *Infurcitinea albicomella* H.-S., Kynance Cove, Cornwall (v.c.1), put up from bare ground at 2 p.m., 6.vii.92, new to Cornwall, and fifth locality from Britain and Ireland; *Tebenna micalis* Mann, Kynance Cove, Cornwall, at rest on *Pulicaria dysenterica* leaf by day, 6.vii.92. *Caloptilia rufipennella* Hübn., Exeter University campus, Devon, one ex larva on *Acer pseudoplatanus*, 10.vi.92, new to Devon; near Teg Down, Winchester, Hampshire, three, ex larvis, 10.ix.92 on *Acer saccharinum* L. (the silver maple), new foodplant; *Dystebenna stephensi* Staint., Brockenhurst Woods, Hampshire (v.c.11), one flying 25.vii.92, first confirmed Hants record; *Gypsonoma oppressana* Treits., Exeter University campus, Devon (v.c.3), one flying around young *Populus nigra* L., 26.vi.92, new to Devon; *Epiblema incarnatana* Hübn., Stockbridge Down, Hampshire (v.c.12), one flying 12.viii.92; second Hants specimen; *Clavigesta sylvestrana* Curt., three exhibited of many bred from larvae in flowers of *Pinus* sp. (probably *P. pinaster* Aiton), 11.v.92; Bicton Common near Exeter, Devon (v.c.3).

KNILL-JONES, S. A.—The following all taken in m.v. light trap at Freshwater, Isle of Wight. *Ostrinia nubilalis* Hübn., 14.vii, 23, 28 & 29.ix.92; *Palpita unionalis* Hübn., 20.viii.92, *Pempelia palumbella* D. & S., 30.vi.92; *Platytes cerussella* D. & S., 23.vi.92; *Diurnea fagella* D. & S., including one melanic, 17.iii & 19.iii.92; *Phtheochroa rugosana* Hübn., 1.vii.92; *Epiphyas postvittana* Walker, 13.vi, 9.viii.92, *Zeiraphera isertana* F., 1.vii.92. Also *Hypsopygia costalis* F., ab., Niton, I.o.W., 29.vii.92 (Plate III, Fig. 6).

Langmaid, Dr J. R.—*Ischnoscia borreonella* Mill., Portland, Dorset, 8.viii.92 (one flying at dusk); *Archinemapogon yildizae* Koçak, Lynwilg, Inverness-shire, 30.vi.91; *Leucoptera orobi* Staint., Tulloch Moor, Morayshire, two bred from mines on *Lathyrus linifolius* (Reichard) Baessler, 28.vi.92; a species not seen for many years; *Elachista pomerana* Frey, Wicken Fen, 11.iv.92, four bred from *Calamagrostis epigejos* (L.) Roth, 11.iv.92; the first time this species has been bred in this country; *Biselachista trapeziella* Staint., Godshill, Hampshire, four bred from *Luzula sylvatica* (Hudson) Gaudin, 18.iv.92; *Exoteleia dodecella* L., Kincraig, Inverness-shire, 2.vii.92, two specimens of a particularly pale form; *Brachmia lutatella* H.-S., Portland, Dorset, one 8.viii.92 (see also R. J. Heckford's exhibit); *Acleris logiana* Cl., Botley Wood, Hampshire, larva on *Betula* sp., 30.ix, specimen bred; new to England; *Dichrorampha sylvicolana* Hein., Kincraig, Inverness-shire, two 28.vi.92.

Lowe, Dr N. R.—A selection from Breconshire (v.c.42). *Opostega crepusculella* Zeller, *Phyllonorycter cavella* Zeller, *Cydia orobana* Treits., *Schiffermuelleria subaquilea* Stainton.

McCormick, R. F. and Penney, C. C.—*Euchromius ocellea* Haw., Portland, Dorset; *Crambus uliginosellus* Zell., Hothfield Bog, Kent; *Catoptria margaritella* D. & S., Dinas, near Harlech, *Eudonia alpina* Curt., Meall-nan-Tarmachan, *E. murana* Curt., Dinas, near Harlech, *E. delunella* Staint., New Forest, Hampshire, *Evergestis extimalis* Scop., Stone, Kent, *Pyrausta cingulata* L., Ardnamurchan Point, Strathclyde, *Sitochroa palealis* D. & S., Stone, Kent, Stonelees, Kent, Hayling Island, Hampshire, *Anania funebris* Ström, Orlestone Forest, Kent, *Udea fulvalis* Hübn., Studland, Dorset, *Aglossa pinguinalis* L., Great Orme Head, Llandudno, *Agrotera nemoralis* Scop., East Blean, Kent, *Galleria mellonella* L., Hounslow, Middlesex, Horley, Surrey, from pupae, *Acrobasis tumidana* D. &. S., Pagham, Sussex, *Epischnia bankesiella* Richardson, Portland, Dorset, from larvae, *Hypochalcia ahenella* D. & S. Portland, Dorset, *Gymnancyla canella* D. & S., Theddlethorp, Lincolnshire, from larvae, *Ancylosis oblitella* Zell., Mersea Island, Essex, Chelmsford, Essex, *Euzophera cinerosella* Zell., Portland, Dorset, from larvae, *Apomyelois bistriatella* Hulst., New Forest, Hampshire, from larvae, garden North Cheam, Surrey, at m.v., *Platyptilia ochrodactyla* D. & S., Leatherhead, Surrey, from larvae, *Stenoptilia zophodactylus* Duponchel, Dungeness, Kent. *Pselnophorus heterodactyla* Müll., Cranham Wood, Gloucestershire, from larvae.

Manning, D. V.—Moths new to Bedfordshire. (1) From Pegsdon Hills, a new nature reserve on chalk downs. *Pterophorus tridactyla* L., *Nemophora cupriacella* Hübn., *Coleophora niveicostella* Zell., *Scythris crassiuscula* Staint. (formerly *S. fletcherella* Meyr.). (2) Cooper's Hill, Ampthill, a nature reserve with heather moor and acid mire. *Prochoreutis sehestediana* F., *Aristotelia ericinella* Zell. (3) *Nemapogon ruricolella* Staint., Cockayne Hatley Wood, *Scoparia basistrigalis* Knaggs, Flitwick Moor, *Dichrorampha aeratana* Pierce & Metcalf, Thurleigh, *Achroia grisella* F., Sharnbrook, *Chionodes fumatella* Dougl., Sharnbrook.

Nash, S.—*Ostrinia nubilalis* Hübn., Fernham, Oxon, 15.viii.92, 18.ix.92, *Evergestis pallidata* Hufnagel, Fernham, Oxon, 21.viii.92. *Aethes margarotana* Dup., Branscombe, S. Devon.

Parsons, M.—A selection of species recorded during 1991 and 1992 including: *Dystebenna stephensi* Staint., *Microthrix similella* Zinck. and *Pseudotelphusa scalella* Scop., all from Richmond Park, Surrey. *Ancylosis oblitella* Zell., *Anania verbascalis* D. & S., *Stenodes alternana* Steph. and *Oegoconia deauratella* H.-S. (bred from roots of sea kale *Crambe maritima* L.), all from Dungeness, Kent, and *Phlyctaenia perlucidalis* Hübn., from Belham Wood, Northamptonshire.

Pickles, A. J. and C. T.—*Udea fulvalis* Hübn, further specimens from

Highcliffe, Dorset (v.c.11), where it appears to be breeding (exhibited for the late E. H. Wild). *Crambus pascuella* L. ab. *obscurellus* Stichel, Lyndhurst, New Forest, Hampshire, 3.vii.92, *Apomyelois bistriatella* Hulst ssp. *neophanes* Durrant, bred series from the New Forest. *Dioryctria schuetzeella* Fuchs, New Forest, 25.vii.92. Apparently the first record for the New Forest.

PLANT, C. W.—An example of the apparently very rare white form *nivella* Rebel of the moth *Calamotropha paludella* Hübn., taken at m.v. light at Rushey Mead, an Essex Wildlife Trust Nature Reserve on the Essex side of the River Stort at Bishops Stortford, on 29.vi.92 (Plate III, Fig. 2).

SIMPSON, DR A. N. B.—*Nemapogon variatella* Clemens, Old Hills, Worcs., 30.v.92 (first record for v.c.37) on oak trunk in old parkland, a similar habitat to where it occurs at Moccas Park in v.c.36. *Monopis weaverella* Scott, Trench Wood, Worcs., 18.v.92, first record for v.c.37. *Swammerdamia compunctella* H.-S., Wyre Forest NNR, 27.v.92, first record for v.c.37. *Euzophera cinerosella* Zell., bred from larvae found in v.92 at inland locality by River Severn at Worcester; the wormwood grows on sandy ballast on waste tip. *Coleophora siccifolia* Staint., bred from cases on *Malus* found in viii.91 at Hartlebury Common, Worcs.; finished feeding in autumn, hatched 8.v.92. *Eucosma conterminana* H.-S., bred from larvae found at Worcester and Evesham in ix.91; first record for v.c.37; apparently newly arrived in county as not present in same sites before 1991. *Clavigesta posticana* Zett., Bransford, Worcs., 23.v.92, in m.v. trap; first record for v.c.37. *Biselachista serricornis* Staint., Kincraig Marsh, Inverness, 3.vii.92, flying over small sedges and rushes at margin of loch. *Opostega crepusculella* Zell., Kincraig Marsh, 3.vii.72. *Elachista eskoi* Kyrki & Karvonen, Kincraig Marsh, Inverness, 29.vi.92, female disturbed from lochside vegetation around midday.

SKINNER, B.—A selection of local or variable species of Pyralidae taken or bred during 1990 to 1992 and including a specimen of *Elophila nymphaeata* L. with reduced wing markings, from the New Forest, Hampshire on 15.vi.92 (Plate III, Fig. 11); and a strongly banded specimen of *Hypochalcia ahenella* D. & S. from Addington, Surrey on 31.v.92. Also *Pempeliella ornatella* D. & S., local form from Burren, Co. Galway, 22.iv.90, (Plate III, Fig. 13).

STERLING, COL. D. H., M. J. AND DR P. H.—*Bohemannia quadrimaculella* Boh., taken at Meathop, Cumbria, vii.92. *Myrmecozela ochraceella* Tengst., taken at Morrone Wood, Aberdeenshire, vii.92. *Bucculatrix capreella* Krog., bred from larvae on *Achillea millefolium* L., collected vii.92 at Invercauld, Aberdeenshire. *Calybites phasianipennella* Hübn., bred from rolls on *Rumex acetosella* L. collected ix.92 at Whixall Moss, Salop. *Depressaria silesiaca* Hein., bred from larvae on *A. millefolium* collected vii.92 Invercauld, Aberdeenshire. *Monochroa palustrella* Dougl., one of two found by Mr J. Pain, warden of Lower Test H.N.T. N.R. v.c.11 in vii.92. First confirmed Hampshire record. *Mompha nodicolella* Fuchs, bred from galls on *Chamaerion angustifolium* (L.) Holub., collected v.92 at Long Eaton, Derbys. *Olethreutes metallicana* Hübn., taken at Braemar, Aberdeenshire vii.92. *Olethreutes obsoletana* Zett., taken at Meikle Elrich Aberdeenshire, vii.92. *Acroclita subsequana* H.-S., from Portland, Dorset, x.92. *Epiblema cnicicolana* Zell., from new H.N.T. reserve, Hook Heath v.c.11, vi.92. *Eucosma conterminana* H.-S., taken in garden m.v. Winchester v.c.11, viii.92. New v.c.11 record. *Selania leplastriana* Curt., bred from larvae on *Brassica oleracea* L. from Folkestone, Kent, v.92. *Cydia medicaginis* Kuznetsov, taken in garden m.v. Winchester, v.c.11, vi.92. *Udea uliginosalis* Curt., taken in Morrone Wood, Aberdeenshire, vii.92. *Pempelia obductella* Zell., taken at Folkestone, Kent, vii.92.

UFFEN, R. W. J.—*Coleophora frischella* L. bred in England. Moths taken around *Trifolium repens* L. on a meadow 'set aside' from wartime cultivation since 1949

and now forming one side of Nomansland Common, Wheathampstead, Herts. They occurred at least from 3 to 16.vi.92, when seedheads were collected. 24 moths emerged in July from 150 seedheads. Cases were shown. No moths were found on an evening visit on 22.vii.92. The clover had finished flowering and the moths had presumably dispersed. It has always been clear from the dates of light-trap records that *C. frischella* would prove to be the only double-brooded *Coleophora* in Britain.

Coleophora alnifoliae Barasch, a moth taken with two larvae in final cases on *Alnus incana* (L.) Moench, before dusk on 1.vi.92 in the car park at Black Park, Iver (new to Bucks.). J. L. Newton and L. Price have found final cases in the autumn, in the Forest of Dean, and have disputed the timing recorded by R. W. J. Uffen in the *Field Guide to the Smaller British Lepidoptera*, dating from his discovery of the species in Surrey and Kent. The likely explanation is that the moth will be found to have a two-year life cycle in the west country. D.O'Keeffe showed Kentish moths from spring larvae in 1991.

Bohemannia quadrimaculella Boh., swept from alder, Lemsford Springs, Welwyn Garden City, Herts., 12.vii.92.

WARREN, R. G.—*Tinea piercella* Bent., Trentham, Staffs., 9.vii.91; new to Staffordshire. *Triaxomera parasitella* Hübn., Great Barr, Staffs., 17.vi.85; first Staffordshire record. *Batia unitella* Hübn., Titchmarsh Wood, Northants, 19.vii.92. *Euhyponomeuta stannella* Thunb., Dovedale, Staffs, 1.vii.56; not recorded elsewhere in the British Isles, an extremely localized colony, not seen recently and possibly extinct. *Blastobasis lignea* Wals., Lichfield, Staffs., 8.vii.92; new to Staffs. *Aphelia unitana* Hübn., Castern Wood, Staffs., 14.vii.79. *Ancylis geminana* Don., Crymlyn Bog, Glamorgan, 2.vii.92. *Cnephasia pasiuana* Hübn., Allimore Green, Staffs., 8.vii.65, *Pammene germmana* Hübn., Nicholaston Wood, Gower, Pembroke, 21.vi.91, *Eucosma hohenwartiana* D. & S. f. *fulvana* Steph., Ketton, Rutland, 19.vii.92, *Amblyptilia acanthodactyla* Hübn., Whixall Moss, Salop, 28.vii.92, *Scoparia ancipitella* La Harpe, Castern Wood, Staffs., 24.vii.82, *Crambus uliginosellus* Zell., Crymlyn Bog, Glamorgan, 2.vii.92.

WEDD, D.—*Phlyctaenia perlucidalis* Hübn., the first (1983) and third (1992) records for Buckinghamshire. *Microthrix similella* Zinck., believed to be the first record for Buckinghamshire.

WOOLDRIDGE, D. B.—*Hypsopygia costalis* F., a pink suffused aberration, Niton, I.o.W., 29.vii.92.

YOUNG, D.—*Myrmecozela ochraceella* Tengst., four specimens. The moth was recorded from 8 out of 14 wood ant nests in the Morrone birch woods, Braemar, a lightly wooded site. No moths were recorded from more casual observations on the Invercauld Estate, Braemar, where the ant nests were amongst dense pine.

YOUNG, DR M. R.—Some noteworthy Microlepidoptera from St Cyrus N.N.R., Kincardineshire. *Lampronia morosa* Zell., *Eulamprotes wilkella* (L.), *Elachista subocellea* (Steph.), *Reuttia subocellea* (Steph.), *Cochylidia rupicola* (Curt.), *Eudonia lineola* (Curt.), *Anerastia lotella* (Hübn.), *Hypochalcia ahenella* (D. & S.), *Oxyptilus parvidactylus* (Haw.), *Adaina microdactyla* (Hübn.).

FOREIGN LEPIDOPTERA

THE INOUE COLLECTION—Two drawers of Japanese Heterocera from the collection of Professor Hiroshi Inoue, shown by the British Museum (Natural History). Professor Inoue is presenting his entire collection of about 150 000 moths to the British Museum (Natural History). This collection is an outstanding resource, the result of many years' study and fieldwork in Asia, particularly Japan, Taiwan and

Nepal. The family Geometridae is particularly well represented, reflecting Professor Inoue's special research interest.

Professor Inoue has honoured the British Museum with his collection for several reasons. First, this museum already contains the largest and most comprehensive systematically arranged collections of Lepidoptera in the world, consisting of 8 million specimens and representing over 70% of the known species. There are more than 60 members of staff in the Entomology Department, of whom 18 specialize in the Lepidoptera.

Second, he feels that the strength of Lepidoptera studies at this institute means that his collection will be preserved for the future as well as immediately forming a part of a vital research tool. Thirdly, as his material becomes absorbed into the main collections, Professor Inoue believes that scientific visitors from Japan will have the opportunity to study a comprehensive collection within one institute.

A rapidly developing area of research in the British Museum is biodiversity—the study and explanation of the richness of species on the planet. A prime area of interest is the forested tropics of South-East Asia, and a strong interdisciplinary team is currently developing studies of Geometridae. Professor Inoue's collection is a timely and vital addition to these projects. Further growth of international research links and collaboration is intended to bring together scientists from Japan and SE Asian countries with scientists from Europe, North America and Australasia to tackle common problems of environmental science. The strategic location of Professor Inoue's collection in London is intended to foster and encourage Anglo-Japanese scientific interaction in tackling fundamental questions about rain forest biology within the context of Lepidoptera systematics.

Lepidopterists at the British Museum already have frequent and friendly associations with Japanese colleagues. The acquisition of the Inoue collection will strengthen and focus these scientific links. Establishment of a trust fund to enable promising young Japanese scientists to undertake periods of study at this Museum would set a highly appropriate seal on this relationship.

CORLEY, M. F. V.—Forty-eight species of Portuguese Gelechiidae *sensu stricto*, excluding Symmocidae, collected in the Algarve during the course of four one-week collecting trips in March 1989, October 1990, September 1991 and April 1992. The majority were taken at light, but the following were reared: *Metzneria aestivella* Zell. from *Carlina corymbosa* L., *Mirificarma mulinella* Zell. from *Cytisus* sp., *Syncopacma larseniella* Gozm. from *Lotus* sp., *Iwaruna biguttella* Dup. from *Dorycnium hirsutum* L., *Mesophleps lala* Agenjo from *Cistus palhinhae* Ingram and *M. oxycedrella* Mill. from *Juniperus phoenicea* L.

All specimens exhibited are named apart from *Teleiodes* sp., *Bryotropha* sp. (known from Spain, but not named), and an unnamed *Pseudotelphusa* sp., known from Spain and Portugal, but erroneously named *Teleiodes paripunctella* Thunb. The correct generic placement of '*Ptocheuusa*' *campicolella* Mann and '*Telphusa*' *cistiflorella* is not known.

Of the species exhibited, seven are previously unrecorded from the Iberian Peninsula, namely *Metzneria santolinella* Amsel, *Eulamprotes phaeella* Heckford & Langmaid, *Ptocheuusa paupella* Zell., *P. campicolella* Mann, *Aristotelia decoratella* Staud. *A. staticella* Mill. and *Scrobipalpa phagnalella* Const.; 18 are new records for Portugal, namely *Coloptilia conchylidella* Hofm., *Metzneria tenuiella* Mann, *M. torosulella* Rebel, *Telphusa cistiflorella* Const., *Mirificarma ulicinella* Staud., *Scrobipalpa wiltshirei* Povolny, *S. superstes* Povolny, *S. instabilella* Dougl., *S. ocellatella* Boyd, *Ephysteris promptella* Staud., *Caryocolum provinciella* Staint., *Palumbina guerinii* Staint., *Syncopacma sangiella* Staint., *S. larseniella* Gozm., *Iwaruna biguttella* Dup., *Mesophleps lala* Agenjo, *M. oxycedrella* Mill. and *Dichomeris acuminatella* Staud.

The remaining species shown were *Metzneria castiliella* Möschl., *Isophrictis lineatella* Zell., *Apodia bifractella* Dup., *Eulamprotes helotella* Staud., *Aristotelia ericinella* Zell., *Schistophila laurocistella* Chrét., *Bryotropha figulella* Staud., *B. domestica* Haw., *B. plebejella* Zell., *Mirificarma eburnella* D. & S., *Phthorimaea operculella* Zell., *Nothris verbascella* D. & S., *Sophronia exustella* Zell., *Aproaerema anthyllidella* Hübn., *Platyedra subcinerea* Haw., *Anarsia lineatella* Zell., *Onebala lamprostoma* Zell. and *Dichomeris limbipunctella* Staud.

Cronin, A. R.—A selection of Rhopalocera from the Philippines.

Edmunds, H.—A mixed exhibit with emphasis on Pyrenean insects, including *Archon apollinus* Herbst, from Ephesus, Turkey, where it flies early in the season and seems quite unaffected by cold conditions; *Parnassius apollo* L. from the Alps and Pyrenees, the former with whiter, less creamy ground colour; *Colias phicomone* Esp., a variable, fast-flying species taken on the very top of a precipitous Pyrenean ridge; *Nymphalis polychloros* L., one of the several seen in 1966 on the edge of a forest in the French Pyrenees. None could be found on a return visit in 1992, the population probably having suffered as a result of the ravages of Dutch elm disease in the area; *Pandoriana pandora* D. & S. from France; *Fabriciana adippe* D. & S., specimens from Devon, the New Forest, Basses Pyrenees and Spain compared. Years back, when the exhibitor took the two shown, the species was flying in thousands in the New Forest—now it has gone; *Boloria pales* D. & S., ssp. *pyrenesmiscens* Vty, from the high Pyrenees; *Clossiana dia* L., widely distributed in the Pyrenees, near the limit of its western distribution in Europe; *Mellicta parthenoides* Kef., widely distributed and common in the Pyrenees; *Erebia hispania* Butler, a very local butterfly found only in one small area of the Pyrenees and on the Sierra Nevada in southern Spain; *E. lefebvrei* Boisd., ssp. *pyrenaea* Oberth., a local species taken on rugged, broken scree in the Spanish Pyrenees; *E. meolans* de Prun., widespread in the Iraty Forest near St Jean Pied de Port, French Pyrenees; *Oreopsyche* sp., a curious moth which flies by day in the Pyrenees and resembles a drifting willowherb or dandelion seed; *Isturgia limbaria* F., extinct in Britain but very common on the broom-covered slopes of the Cevennes, S. France; *Crocota peletieraria* Dup. from the high Pyrenees; *Gnophos obfuscatus* D. & S., large and well-marked specimens from Mull; *Spiris striata* L., widespread in flowery mountain meadows and easily disturbed by day.

Goater, B. and Mrs J.—A selection of moths taken in Canton Valais, Switzerland, 10–19.vi.92. (1) Sesiidae. *Chamaesphecia affinis* Staud., locally common by day over the foodplant, *Helianthemum nummularium* (L.) Miller.

(2) Pyralidae. *Chrysoteuchia culmella* L., ssp. *montanella* Steph., *Catoptria conchella* D. & S., *C. mytilella* Hübn., *Pediasia luteella* D. & S., *Paracorsia repandalis* D. & S., *Catastia marginea* D. & S., *Pterothrixidia rufella* Dup., *Myelopsis tetricella* D. & S.

(3) Geometridae. *Idaea sericeata* Hübn., *I. flaveolaria Hübn.*, *I. aureolaria* D. & S., *I. humiliata* Hufn., *Scotopteryx vicinaria* Dup., *Horisme aemulata* Hübn., *H. calligraphata* H.-S., *Paraeulype berberata* D. & S., *Eupithecia alliaria* Staud., ssp. *notata* Dietze, *E. cauchiata* Dup., *E. pernotata* Guen., *E. satyrata* Hübn., *Epilobophora sabinata* Geyer, *Pseudopanthera macularia* L., much larger than specimens from England, shown for comparison, *Psodos quadrifaria quadrifaria* Sulz. compared with the narrower-banded ssp. *pyrenaica* Schawerda from the French Pyrenees.

(4) Noctuidae. *Yigoga forcipula* D. & S., *Chersotis fimbriola* Esp., ssp. *maravignae* Dup., *Eugraphe sigma* D. & S., *Polia serratilinea* Treits., *Mamestra aliena* Hübn., *Sideridis anaphales* Nye, *Hadena caesia* D. & S., representatives of what appears to be a very variable race, *H. laudeti* Boisd., *Cucullia santonicae* Hübn., ssp. *odorata* Guen., *Omia cymbalariae* Hübn., netted by day, *Calliergis ramosa* Esp., *Apamea*

rubrirena Treits., *A. platinea* Treits., *Panchrysia v-argenteum* Esp., bred from a larva on *Thalictrum*, *Syngrapha ain* Hochenwarth, *Polypogon tentacularia* L., locally common by day along border of hay meadow.

HALL, N.—(1) Specimens of the hawk-moth *Marumba quercus* D. & S. with notes on breeding. A female specimen of this species, the oak hawk-moth, caught in northern Spain in vii.91 laid about 50 eggs in a pill-box. The eggs were covered with meconium but nevertheless proved fertile. According to Friedrich (*Breeding butterflies & moths*, English edition, 1986) the species is very difficult to breed and heavy losses or total loss of all stock can suddenly occur. In this case however, despite generally ignoring Friedrich's advice, no heavy losses were experienced at any stage, though numbers slowly dwindled to about 25 full-fed larvae. Nearly half of these were given away to friends. From the rest, eleven pupae were obtained; the first to emerge was a female, followed by eight males. Two female pupae failed to emerge.

The young larvae ate only their eggshells in the first instar, resting along the midrib on the underside of an oak leaf afterwards until ecdysis. The dry leaves with young larvae were removed and placed, four to a box, in containers with fresh food. Both deciduous and evergreen oak were provided during the early instars, the smaller larvae preferring the deciduous, in the final instars only evergreen oak was provided, and the larvae showed a clear preference for the fresh growth of the current year. Food was changed every three days. No attempt was made to expose the larvae to fresh air and sunlight (said to be essential by Friedrich). Full-fed larvae were given individual boxes of peat in which to pupate so that they would not disturb one another, and were overwintered in these boxes, dug up and resting on the surface of the peat, in a cool cellar. They were brought into a warm room in April in the expectation that emergence would occur in April/May, but they did not start until the end of June, and the pupae had to be given periodic tepid baths to prevent them from drying out.

(2) Two cases of Lepidoptera from north and east Spain during September 1992, the first containing species (mostly noctuids) unknown in Britain, and the second with species occurring in Britain but represented in Spain by different forms or subspecies. Zygaenidae: *Zygaena occitanica* Vill. and *Z. trifolii* Esp. from Cullera, Valencia, sandhills, with cocoons and pupa cases. Pyralidae: *Loxostege sticticalis* L., *Uresiphita polygonalis* F., *Sclerocona acutellus* Ev. Danaidae: *Danaus chrysippus* L. from Cullera, Valencia, now a regular migrant to the east coast of Spain as far north as the Ebro delta, some 100 miles to the north of Cullera. The foodplant, *Asclepias*, is not native but now widely planted, and some individuals are said to be locally bred. Lasiocampidae: *Streblote panda* Hübn., a male specimen of this peculiar lasiocampid which is restricted to the Mediterranean coast. Geometridae: *Scotopteryx peribolata* Hübn. Notodontidae: *Furcula bifida* Brahm. Arctiidae: *Coscinia cribaria* L., *Eilema predotae* Schawerda. Noctuidae: *Euxoa mendelis* Fernandez, a Spanish endemic, *Agrotis crassa* Hübn., *A. drempta* Staud., *A. puta* Hübn., *Powellinia pierreti* Bugnion, *Cladocerotis optabilis* Boisd., *Ochropleura constanti* Mill., *O. plecta* L., *Paradiarsia glareosa* Esp., *Xestia kermesina* Mab., *X. agathina* Dup., *Mesogona acetosellae* D. & S., *Mythimna umbrigera* Saalm., *Episema glaucina* Esp., *Leucochlaena oditis* Hübn., *Aporophyla haasi* Staud., *Allophyes alfaroi* Agenjo, *Blepharita spinosa* Chrét., *Dryobotodes cerris* Boisd., *Trigonophora flammea* Esp., *T. jodea* H.-S., *T. crassicornis* Oberth., *Polymixis canescens* Dup., *P. xanthomista* Hübn., *P. argillaceago* Hübn., *Ammopolia witzenmanni* Standf., *Simyra albovenosa* Goeze, *Eumichtis lichenea* Hübn., *Pseudenargia ulicis* Staud., *Luperina nickerlii* Freyer, ssp. *albarracina* Schwingenschuss, *L. dumerilii* Dup, *Photedes pygmina* Haw., *Platysenta viscosa* Freyer, *Spodoptera cilium* Guen., *Stilbia andalusica* Brsn, *S. philopalis* Graslin, *Nycteola siculana* Fuchs, *Eublemma cochyloides* Guen., *E. jucunda*

Hübn., including two black females with uniformly curved fasciae, a form the exhibitor had not seen illustrated, together with a normal female with angular fasciae on the forewings, *E. parva* Hübn., *Trichoplusia ni* Hübn., *Hypena lividalis* Hübn.

HOLLINGWORTH, T. S.—(1) Some interesting and sometimes unusual French and Spanish Heterocera. Limacodidae: both British species occur in S. W. France; two specimens of *Heterogenea asella* D. & S. were exhibited. Psychidae: *Oreopsyche plumifera* Ochs. found in February, flying in numbers in hot sunshine over a patch of damp, partially-frozen ground on a south-facing slope in the Pyrenees, above the snow line. Coleophoridae: *Coleophora vibicella* Hübn., with its case, a common species in S. W. France. Oecophoridae. Several species, including *Topeutis barbella* F., *Oecophora bractella* L., *Orophia sodridella* Hübn. and *Esperia oliviella* F. Ethmiidae: *Ethmia dodecea* Haw., *E. terminella* Fl. and *E. bipunctella* F. together with some unidentified tineids of similar coloration. Plutellidae: *Ypsolopha asperella* L., a species which flies early in the year and is probably overlooked; *Rhignostis incarnatella* Staud. Geometridae: the tiny emerald, *Eucrostis indigenata* Vill. from the Ebro delta, also found in southern France; *Idaea extarsaria* H.-S., ssp. *eriopodata* Gras., stated by Leraut to be confined to Corsica, but the specimens shown were from S. W. France; *Nychiodes andalusiaria* Mill., *Psodos quadrifaria* Sulz., ssp. *pyrenaea* Ch. Oberth., found above the tree line in the Pyrenees at flowers of alpenrose, *Rhododendron ferrugineum* L., where it is locally common. Noctuidae: two examples of *Luperina dumerilii* Dup., *Autographa bractea* D. & S., evidently quite common in and around the Pyrenees; *Ctenoplusia accentifera* Lef., on the other hand, is not at all common in mainland France—the specimen shown was from Bastia, Corsica; the attractive yellow-hindwinged catocalid, *Ephestia fulminea* Scop.

(2) A box containing between 30 and 40 species of European Pyralidae, subfamily Pyraustinae. Included were several members of the genus *Pyrausta* Schrank, a specimen of *Udea alpinalis* D. & S. and several of the Pyrenean form of *U. olivalis* D. & S., distinct from that found in Britain.

(3) Another box containing Pyralidae of different subfamilies, including the unusual and little known *Heliothela atralis* Hübn., the attractive phycitine *Eurhodope rosella* Scop. and the crambine *Chilo suppressalis* Walk., a pest wherever rice is grown.

PLANT, C. W.—Heterocera taken in Hungary during 1991 and 1992. Lasiocampidae: *Trichiura crataegi* L. Notodontidae: *Tritophia tritophus* D. & S. Thaumetopoeidae: *Thaumetopoea processionea* L. Noctuidae: *Opigena polygona* D. & S., *Chersotis rectangula* D. & S., *C. margaritacea* Vill., *Noctua interposita* Hübn., *Lycophotia porphyrea* D. & S., *Mesogona acetosellae* D. & S., *Anarta myrtilli* L., *Hada nana* Hufn., *Mamestra brassicae* L., *Mythimna turca* L., *M. l-album* L., *Antitype chi* L., *Agrochola nitida* F., *Cosmia sulphurago* Staud., *Acronicta megacephala* D. & S., *A. leporina* L., *Craniophora ligustri* D. & S., *Cryphia algae* F., *Amphipyra livida* F., *Telesilla amethystina* Hübn., *Actinotia polyodon* Cl., *Calamia tridens* Hufn., *Hoplodrina aspersa* Ramb., *H. superstes* Ochs., *Eublemma purpurina* Hübn., *Emmelia trabealis* Scop., *Nycteola asiatica* Krul., *Abrostola asclepiadis* D. & S., *Macdunnoughia confusa* Steph., *Catocala nupta* L., *C. elocata* Esp., *C. electa* View., *C. puerpera* Giorna, *Dysgonia algira* L., *Paracolax tristalis* F.

REID, J.—An extreme aberration of *Melitaea didyma* Esp. and another of *Lysandra bellargus* Rott., taken while the exhibitor was photographing butterflies in France.

SIMMONS, M. J.—Insects, mostly Lepidoptera, taken in Andorra between 20.vii. and 2.viii.1992. Hepialidae: *Pharmacis pyrenaicus* Donz. Zygaenidae: *Zygaena carniolica* Scop., *Z. fausta* L., *Z. hilaris* Ochs. Sesiidae: *Bembecia scopigera* Scop. Lasiocampidae: *Malacosoma castrensis* L., *Lasiocampa quercus* L., *Dendrolimus pini* L., *Gastropacha quercifolia* L., *Phyllodesma suberifolia* Dup. Geometridae: *Thalera fimbrialis* Scop.,

Scopula incanata L., *S. immorata* L., *Scotopteryx moeniata* Scop., *S. diniensis* Neuburger, *S. coelinaria* L., *Hydriomena furcata* Thunb., *Euphyia biangulata* Haw., *Crocota peletieraria* Dup., *Nychiodes andalusiaria* Mill., *Cleorodes lichenaria* Hufn., *Gnophos obscuratus* D. & S., *Aspilates gilvaria* D. & S. Sphingidae: *Laothoe populi* L., *Hyloicus pinastri* L., *Macroglossum stellatarum* L., *Deilephila porcellus* L. Notodontidae: *Phalera bucephala* L., *Furcula bifida* Brahm, *Notodonta dromedarius* L., *Pheosia tremula* Clerck, *Drymonia querna* D. & S., *Rhegmatophila alpina* Bell., *Clostera curtula* L., *C. pigra* Hufn. Thaumetopoeidae: *Thaumetopoea pityocampa* D. & S. Lymantridae: *Leucoma salicis* L., *Lymantria monacha* L. Arctiidae: *Setina irrorella* L., *Chelis maculosa* Gerning, *Diaphora mendica* Clerck, *Euplagia quadripunctaria* Poda. Noctuidae: *Chersotis ocellina* D. & S., *Eugnorisma depuncta* L., *Xestia rhomboidea* Esp., *Pachetra sagittigera* Hufn., ssp. *pyrenaica* Oberth., *Hadena compta* D. & S., *H. filigrana* Esp., ssp. *xanthocyanea* Hübn., *Cucullia lucifuga* D. & S., *C. verbasci* L., *Lophoterges millierei* Staud., *Polymixis dubia* Dup., *Antitype chi* L., *Acronicta leporina* L., *A. euphorbiae* D. &. S., *Cryphia domestica* Hufn., *C. ravula* Hübn., *Enargia paleacea* Esp., *Cosmia affinis* L., *C. trapezina* L., *Apamea lateritia* Hufn., *Calyptra thalictri* Borkh., *Bena prasinana* L., *Syngrapha interrogationis* Hübn., ssp. *pyrenaica* Hamps., *Panchrysia v-argenteum* Esp., *Autographa bractea* D. & S., *Lygephila craccae* D. & S., *Euclidia glyphica* L., *Laspeyria flexula* D. & S., *Catocala promissa* D. & S., *C. nymphagoga* Esp., *C. conversa* Esp. Rhopalocera: *Hipparchia alcyone* D. & S., *Erebia meolans* de Prun., *E. oeme* Hübn., *E. cassioides* Hohenwarth, *Coenonympha arcania* L., *Lysandra coridon* Poda, *Agriades glandon* de Prun., *Pseudaricia nicias* Meig., *Spialia sertorius* Hoffman.

Of particular interest were the following: (1) *Pharmecis pyrenaicus* a rare Pyrenean endemic; the female is brachypterous with forewing length c.8 mm, and cannot fly. The male, a specimen of which was exhibited, is fully winged.

(2) *Bembecia scopigera*. Although the identity of the specimens requires confirmation, it is certainly new to Andorra. According to Dr P. J. L. Roche, the only Sesiidae reported from Andorra to date are *Sesia apiformis* Clerck, *Synanthedon monspeliensis* Staud. and *Bembecia chrysidiformis* Esp. and it is certainly not one of these.

(3) *Lymantria monacha*. The specimens exhibited show a gradation from normal to melanic forms.

(4) *Panchrysia v-argenteum*. Until 1980, this species was unknown in the Pyrenees, the nearest localities being in the Alps. On 3.viii.80. Dr Roche found a specimen resting on a wall near a street lamp in St Julia de Loria, and more recently it has been reported from the Eastern Pyrenees and from the Val d'Aran in northern Spain. It will probably be found wherever the foodplant, *Thalictrum*, occurs in the eastern Pyrenees.

TREMBATH, D. A.—(1) A selection of interesting or rare Rhopalocera collected in Kenya, mostly between December 1989 and April 1992, including the three subspecies of *Papilio dardanus* Brown with female forms; *Graphium polystratus* Gross-Smith and *G. kirbyi* Hewitson, found commonly on the coast before the main rains of April; *Pontia glauconome* Klug, an uncommon butterfly of the desert region of northern Kenya; *Colotis hetarera* Gerstacker, the three subspecies, including ssp. *lorti* Sharp, from Mount Kulal in north Kenya; *Amauris echeria* Stoll, ssp. *septrionis* Poulton; *Acraea pudorina* Staud., an uncommon butterfly in Kenya shown together with the very rare *A. utengulensis* Thurau taken in 1982; a short series of what is thought to be an undescribed but not new *Acraea* sp., similar to *A. braesia* Godman. D'Abrera illustrates the female as a form of *A. braesia*, but not the male, which is similar to the female: a distinctive feature is the black discal spot, acute to the costa and not obtuse as in *A. braesia*; *Neptis nicobule* Holland, a canopy-inhabiting species

which is probably less rare than supposed; *Pseudathyma plutonica* Butler, a rare species from western Kenya; seven species of *Charaxes* including *C. smaragdalis* Butler and *C. blanda* Poulton, only known from coastal Kenya; thirteen species of Hesperiidae new to the exhibitor.

(2) A drawer containing 36 species of Kenyan Lycaenidae, some of the rarer being: *Aslauga purapescens* Holland; *Lipaphnaeus aderna pan* Talbot; *Chloroselas esmeralda* Butler from northern Kenya, a butterfly that flits with tremendous speed and is difficult to follow with the eye, locally common but rarely seen; *Erisinia bilinea* Talbot, a very rare species from western Kenya; *Iolaus menas tatiana* D'Abrera, fairly confidently identified, an extremely rare species and possibly one of only a few from Kenya; six species of confusingly similar *Athene* spp.; *Lepidochrysops pterou* Bethune Baker, *L. elgonae* Stempffer and *L. neonegus* Bethune Baker—all very local and fast, powerful fliers which are difficult to net on the rocky terrain which is their typical habitat.

TREMEWAN, W. G.—A box of *Zygaena* F. species collected in Spain, France and Italy during July and August, 1992: *Zygaena sarpedon* Hübn., *Z. rubicundus* Hübn., *Z. purpuralis* Brünn., *Z. hilaris* Ochs., *Z. rhadamanthus* Esp., *Z. anthyllidis* Hochenwarth, *Z. loti* D. & S., *Z. nevadensis* Ramb., *Z. osterodensis* Reiss, *Z. transalpina* Esp., *Z. hippocrepidis* Hübn., *Z. filipendulae* L., *Z. trifolii* Esp., *Z. lonicerae* Scheven.

WEST, B. K.—(1) Three pairs of confusingly similar-looking Rhopalocera—*Eurema hecabe* L. and *E. senegalensis* Boisd. from the Atakora Mountains, Togo; *Eurema daira* Godart and *E. elathea* Cram. from Port of Spain, Trinidad; *Acraea encedon* L. and *A. lycia* F. from Kpalimé, Togo. *E. senegalensis* and *A. lycia* have recently been raised to specific rank.

(2) *Colias australis* Verity, an extreme aberration taken at Langen am Arlberg, Austria, 18.viii.52 (Plate II, Fig. 10); *Colotis ione* Godart, gynandromorph taken at Wyliespoort, N. Transvaal, 9.vii.56 (Plate II, Fig. 11).

DIPTERA

ALEXANDER, K. N. A. AND FOSTER, A. P.—A selection of Syrphidae found during the National Trust's Biological Survey visit to Northern Ireland in 1992 (localities National Trust property unless stated): *Brachyopa scutellaris* R.-D., Inisherk Island, Crom Castle Estate, Fermanagh, female swept on 1.vi; *Orthonevra brevicornis* Loew, Crom Castle Estate, 26.v; *Anasimyia transfuga* (L.), Lough Coole, Castle Coole Estate, Fermanagh, 2.vi, also seen at Crom Castle, 26.v; *Parhelophilus versicolor* (F.), Castle Ward Estate, Down, 24.vi; *Criorhina berberina* (F.), widespread in ancient woodland and old parkland in Fermanagh—Crom Castle Estate, 26.v; Castle Coole Park, 2.vi and Florence Court, 3.vi; *Tropidia scita* (Harris), brackish marsh below cliffs at Port Noffer, Giant's Causeway, Antrim, 8.vi—also seen at Crom Castle Estate and Quoile Pondage N. N. R. (not N. T. property), Down, 4.vii.

DOBSON, J.—(1) Twenty-one species of Diptera (from Surrey, unless stated otherwise) including the following: *Atherix ibis* (F.) (Athericidae), Thundry Meadows, 26.vi.1991; *Dioctria oelandica* (L.) (Asilidae), Elstead Common, 2.vi; *Pipiza lugubris* (F.) (Syrphidae), Camel Trail Forestry Commission Reserve, Cornwall, on bramble blossom, 3.vii.1991; *Scaeva selenitica* (Meig.) (Syrphidae), Hankley Common, 9.vi.1991; *Lonchoptera nitidifrons* Strobl (Lonchopteridae), Thundry Meadows, ii.v.1991; *L. meijerei* Collin, females by the River Tay, Stanley, v.c.88, 14.v.1991; several examples of *Myopa* species (Conopidae), not yet fully determined, including three species found on the same *Rhododendron* bush at Netley; *Myopites inulaedyssentericae* Blot (Tephritidae), Botany Bay, 20.vii.1991, a number seen on

Pulicaria; *Servillia ursina* (Meig.) (Tachinidae), Netley, 8.iv.1991, several sunning on logs; *Nowickia ferox* (Panz.) (Tachinidae), Netley, 26.vii.1992; *Gymnosoma rotundatum* (L.) (Tachinidae), Botany Bay, 14.vii.1991, also found very locally at Netley in 1991 and 1992; *Cylindromyia interrupta* (Meig.) (Tachinidae), Botany Bay, 30.v. and 14.vii.1991.

(2) Some larger Brachycera from Holland, found on extensive coastal dunes at Amsterdamse Waterleideningduinen, 5.vii.1992, including *Hemipenthes morio* (L.) (Bombyliidae) and some unnamed Therevidae.

GODFREY, A.—Twelve species of assorted Diptera from Scotland, Yorkshire and Oxfordshire: *Aspistes berolinensis* (Meig.) (Scatopsidae), Killinallan dunes, Islay, 21.vi.1992, frequent on several machair dunes on Islay; *Acrocera orbicula* (F.) (Acroceridae), Mugdock Country Park, north of Glasgow, 18.vi.1992, new to Scotland, first record north of Cumbria; *Empis laetabilis* Collin (Empididae), Pot Ridings Wood, S. Yorks., 11.vii.1992, frequent there in 1991 and 1992; *Nephrocerus flavicornis* Zett. (Pipunculidae), Bradfield Farm, Abingdon, Oxon., 14.vii.1992, water trap in shady woodland by railway line; *Parochthiphila coronata* (Loew) (Chamaemyiidae), Tinsley Sewage Beds, Sheffield, S. Yorks., 29.vii.1991, currently known from only two other sites in Britain, both coastal; *Eccoptomera longiseta* (Meig.) (Heleomyzidae), Dry Sandford Pit, Oxon., 17.v.1992, base of 'cliffs' in limestone quarry; *Crumomyia pedestris* (Meig.) (Sphaeroceridae), by River Ock, Abingdon, Oxon, 14.vii.1992, pitfall trap at edge of field near *Carex* marsh; *Periscelis annulata* (Fall.) (Periscelidae), Ballinluig Shingle Island, Pitlochry, Perthshire, 15.vi.1992, swept by J. Mousley; *Pseudopachychaeta heleocharis* (Nartshuk) (Chloropidae), Tinsley Sewage Beds, Sheffield, S. Yorks., 31.vii.1991, det. J. W. Ismay; *Scathophaga scybalaria* (L.) (Scathophagidae), two sites on east side of Islay, Baleachdrach and Loch Leathen, acid bog, 22. and 23.vi.1992; *Azelia aterrima* (Meig.) (Muscidae), Abhain à Bhail Lochdaraich, Islay, 22.vi.1992; *Coenosia distinguens* Collin (Muscidae), Baleachdrach, 12.viii.1992, bog, frequent at several sites on Islay.

HALSTEAD, A. J.—Various Diptera collected in 1992: *Oxycera dives* Loew (Stratiomyidae), Water of Ruchill, Auchnashelloch, Mid Perths., 18.vi., swept from sallow; *Xylophagus ater* Meig. (Xylophagidae), Damhead Wood, W. Perths., 14.vi; *Rhagio notatus* (Meig.) (Rhagionidae), Damhead Wood, W. Perths., 14.vi; *Xanthogramma festivum* (L.) (Syrphidae), Witley Common, Surrey, 16.v; *Cheilosia illustrata* (Harris) (Syrphidae), Stirling University Lake, Stirlings., 20.vi, a specimen lacking the usual wing shading (a typical specimen included for comparison); *Conops vesicularis* L. (Conopidae), Witley Common, Surrey, 16.v, in jaws of a crab spider on *Crataegus* blossom; *Trypeta immaculata* Macq. (Tephritidae), Water of Ruchill, Auchnashelloch, Mid Perths., 18.vi; *Ceroxys urticae* (L.) (Otitidae), Royal Horticultural Society Garden, Wisley, Surrey, 27.iv, in Polythene tunnel, a specimen with broken second and third cross bars on the wings (a typical specimen included for comparison); *Sphenella marginata* (Fall.) (Tephritidae), Chobham Common, Surrey, 9.viii., swept from *Senecio* species; *Agromyza abiens* Zett. (Agromyzidae), Royal Horticultural Society Garden, Wisley, Surrey, emerged 24.viii, ex leaf mines in *Echium candicans* (a glasshouse plant); *Pegomya bicolor* (Hoff.) (Anthomyiidae), Chertsey, Surrey, emerged 19.vi., ex leaf mines in *Begonia semperflorens*; *Phasia hemiptera* (F.) (Tachinidae), Juniper Bottom, Box Hill, Surrey, 11.vii.

MCLEAN, I. F. G.—Eleven species of Diptera recorded at the Dinton Pastures Inaugural Field Meeting, Berks., 20.ix.1992, all from the margin of Mungell's Pond, including a map and photograph showing the location of the collecting area; the muddy fringes of the drying out pool proved unexpectedly good for some flies characteristic of wetlands and aquatic margins. The following species were exhibited: *Dolichopus*

latelimbatus Macq.; *Rhaphium micans* (Meig.); *Campsicnemus pectinulatus* Loew; *Chrysotus suavis* Loew (all above Dolichopodidae); *Colobaea punctata* (Lund.) (Sciomyzidae); *Pherbellia grisescens* (Meig.) (Sciomyzidae); *Sciomyza simplex* Fall. (Sciomyzidae); *Sphenella marginata* (Fall.) (Tephritidae); *Ochthera mantis* (Deg.) (Ephydridae); *Elachiptera uniseta* Collin and *E. diastema* Collin (Chloropidae).

PARKER, M. J.—Seventeen species of Diptera from Dorset and Scotland: *Chrysops sepulcralis* (F.) (Tabanidae), Oakers Wood, Dorset, 6.viii.1989, locally numerous, swept from *Narthecium ossifragum* (L.) Hudson; *Thyridanthrax fenestratus* (Fall.) (Bombyliidae), Winfrith Heath, Dorset, 27.vii.1991, female on *Senecio jacobaea* L.; *Laphria flava* (L.) (Asilidae), Culbin Forest, Nairn, 15.vii.1991, male basking on pine log; Syrphidae: *Microdon eggeri* Mik, Scrubbity Burrows, Cranbourne Chase, Dorset, 25.v.1992, female on *Betula pendula* Roth log; *Platycheirus ramsarensis* Goeldlin, Maibach & Speight, Loch à Ghabhran, W. Ross, 17.vii.1991, male swept from loch side; *P. melanopsis* Loew, Ben Lawers, Mid Perths., 17.vi.1992, males hovering by dirt track, female swept at 2000 feet and above; *P. amplus* Curran, Falls of Leny, W. Perths., 15.vi.1992, male swept from damp meadow within wood; *Xanthogramma festivum* (L.), Ashley Chase, Dorset, 25.v.1991, male hovering by an anthill; *Chrysotoxum vernale* Loew, Tadnoll, Dorset, 4.v.1992, male on *Caltha palustris* flower; *Cheilosia carbonaria* Egger, Hooke Park, Dorset, 14.viii.1991, male and female on *Leontodon hispidus* L.; *C. cynocephala* Loew, Warmwell Heath, Dorset, 18.viii.1991, male basking on herbage by roadside; *Ferdinandea ruficornis* (F.), Oakers Wood, Dorset, 21.iv.1991, female on *Prunus spinosa* L. flower, second Dorset record; *Pelecocera tricincta* Meig., Warmwell Heath, Dorset, 24.vii.1991, swept from dry heath; *Chamaesyrphus scaevoides* (Fall.), Culbin Sands, Nairn, 15.vii.1991, swept near to spot where *C. caledonicus* Collin was taken (see Exhibit by A. Wass below); *Psilota anthracina* Meig., Mark Ash Wood, New Forest, Hants., 16.v.1992, male on *Crataegus monogyna* Jacq. flower; *Criorhina ranunculi* (Panz.), Oakers Wood, Dorset, 13.iv.1991, male on *Prunus spinosa*; *C. asilica* (Fall.), Oakers Wood, Dorset, 17.v.1992, male on *Crataegus monogyna* flower; Princes Wood, Dorset, 22.v.1992, female on *Allium ursinum* L. flower.

PERRY, I.—A selection of uncommon Diptera found in 1992: *Platypalpus ingenuus* (Collin) (Hybotidae), Wicken Fen, Cambs., 31.v., swept from grassland; *Rhamphomyia physoprocta* Frey (Empididae), Gartochraggan, Loch Lomond, Stirlings., 17.vi, female swept from marsh, new to Scotland; *Hilara media* Collin (Empididae), Methven Woods, Perths., 18.vi, male swept from shady stream in oak woodland, new to Scotland; *Dolichopus maculipennis* Zett. (Dolichopodidae), Ben Lawers, Perths., 16.vi, at 750–850 metres by boggy pool and on seepages; *Systenus bipartitus* (Loew) (Dolichopodidae), Craigellachie, Inverness, 21.vi., male swept from birch woodland, new to Scotland; *Xanthandrus comtus* (Harris) (Syrphidae), Wicken Fen, Cambs., 31.viii at *Succisa pratensis* Moench flowers; *Platycheirus melanopsis* Loew (Syrphidae), Ben Lawers, Perths., 16.vi, male hovering low over a path at 660 metres; *Cryptaciura rotundiventris* (Fall.) (Tephritidae), R. Tay, Dunkeld, Perths., 19.vi; *Themira gracilis* (Zett.) (Sepsidae), R. Spey, Boat of Garten, Inverness, 20.vi, swept from seepages; *Metopomyza ornata* (Meig.) (Agromyzidae), Wicken Fen, Cambs., 30.vii, swept from a small patch of *Butomus umbellatus* L.; *Macronychia ungulans* (Pand.) (Sarcophagidae), Wicken Fen, Cambs., 30.vii, on *Pastinaca sativa* L. flowers; *Norellia spinipes* R.-D. (Scathophagidae), Waresley Wood, Cambs., 5.ix, swept in oak woodland.

SIMMONS, M. J.—Nineteen species of Diptera included in exhibit of insects from Andorra: mostly Syrphidae, among them several species of *Chrysotoxum* awaiting determination; some larger Brachycera and the large tachinid *Tachina grossa* (L.) were also included.

UFFEN, R. W. J.—*Norellia spinipes* (Meig.) (Scathophagidae): photographs of tenanted larval mines in wild daffodils, Cave Wood, Woolmer Green, Herts., 16.v.1992; the larvae fed in the white leaf bases, causing slight speckling; attacked leaves senesced somewhat prematurely; larvae had been found in some varieties of cultivated daffodils in the exhibitor's garden 1 km away.

WASS, A.—Ten species of Diptera from Dorset and Scotland: *Oxycera pardalina* Meig. (Stratiomyidae), Sutton Poyntz, Dorset, 25.vi.1992, on *Salix cinerea* L.; *O. morrisii* Curt., Weymouth, Dorset, 15.vii.1992, coastal seepage; *Bombylius minor* L. (Bombyliidae), Studland Heath, Dorset, 21.vii.1992, at *Erica cinerea* L.; *Conops ceriaeformis* Meig. (Conopidae), Winfrith Heath, Dorset, 17.vii.1992, on *Senecio jacobaea* L.; *Conops flavipes* L., Oakers Wood, Dorset, 4.viii.1991, 'var. *melanocephala* Meig.' on *Cirsium arvense* (L.) Scop.; *Sphaerophoria loewi* Zett. (Syrphidae), Skinsflats S. S. S. I., Stirlings., 16.vi.1992, swept from saltmarsh; *Cheilosia cynocephala* Loew (Syrphidae), Winfrith Heath, Dorset, 22.vii.1992, female on *Senecio jacobaea*; *Eristalis rupium* F. (Syrphidae), Falls of Leny, W. Perths., 15.vi.1992, on *Cirsium arvense* flower; *Paragus tibialis* (Fall.) (Syrphidae), Oakers Wood, Dorset, 19.v.1992; *Chamaesyrphus caledonicus* Collin (Syrphidae), Culbin Forest, Nairn, 15.vii.1991, male swept from grass on sand dunes, probably the third British record (also see under Exhibit by M. J. Parker above).

COLEOPTERA

ALEXANDER, K. N. A. AND FOSTER, A. P.—A selection of the more interesting beetles found during the National Trust's Biological Survey 1992 visit to Northern Ireland. Those species believed to be new to Ireland are indicated by an asterisk. All localities are N. T. land unless otherwise indicated. **Notiophilus aestuans* (Mots.), stony summit heath, Slieve Donard, Co. Down, 2.vii.1992; **Miscodera arctica* (Payk.), a few beneath stones in summit heath, Slieve Donard, 2.vii.1992; *Pterostichus oblongopunctatus* (F.), one in rotting log, Breen Oakwood N. N. R. (not N. T. land), Co. Antrim, 7.vi.1992, and another in similar situation at Murlough Bay, Co. Antrim, 11.vii.1992—a rare beetle in Ireland; *Lebia cruxminor* (L.), one active in poorly drained heathy pasture at Derrymacrow, Crom Castle Estate, Co. Fermanagh, 4.vi.1992—this is the third Irish record, the first from N. Ireland; **Agabus chalconatus* (Panz.), one in water trough within rough pasture surrounded by ancient woodland, Gole, Crom Castle Estate, 1.vi.1992, also found in *Sphagnum* pool on Argory Moss, Co. Armagh, 1.vii.1992; *Thanatophilus dispar* (Herbst), one in loughshore swamp by Upper Lough Erne, Crom Castle Estate, 26.vi.1992; *Aclypea opaca* (L.), a few beneath stones in summit heath, Slieve Donard, 2.vii.1992; *Silpha subrotundata* (Leach), found very widely, in Counties Antrim, Armagh, Donegal, Down, Fermanagh, and Londonderry, v/vi.1992; *Ampedus pomorum* (Herbst), a few beaten from *Salix* bush on edge of Garry Bog (not N. T. land), Co. Antrim, 7.vi.1992; *Dacne bipustulata* (Thunb.), very frequent on birch polypore and on elm bracket fungus in wet woodland at Springhill, Co. Londonderry, 25.vi.1992—a rare species in Ireland; *Halyzia 16-guttata* (L.), beaten from oak foliage, Crom Castle Park, 26.v.1992, and also beaten from oak at Florence Court, Co. Fermanagh, 3.vi.1992, and in Craigagh Wood, Co. Antrim, 17.vi.1992; *Orchesia undulata* Kraatz, one on dead rowan bough by Glenveagh Oakwood (not N. T. land), Co. Donegal, 14.vi.1992; **Tetratoma fungorum* F., one knocked from birch polypore in undercliff woodland at Murlough Bay, 16.vi.1992; **Abdera flexuosa* (Payk.), Inisherk Island, Crom Castle Estate, 1.vi.1992; *Alosterna tabacicolor* (Deg), plentiful in Reilly and Gole Woods, Crom Castle Estate, 28.v., 1.vi.1992—a rare species in Ireland; *Pogonocherus hispidus* (L.), single example from woodland on Inishfendra

Island, Crom Castle Estate, 28.v.1992; *Donacia aquatica* (L.), single example, Inishfendra Island, Crom Castle Estate, 28.v.1992; *D. bicolora* Zschach, *D. impressa* Payk., and *D. thalassina* Germ., widely and plentifully on loughshore vegetation on Crom Castle Estate, v.1992; *D. impressa* also by Ballydawley Lough (not N. T. land), Co. Sligo, 30.v.1992; *Oulema septentrionis* Weise, found very widely, in Counties Antrim, Down, and Fermanagh, v/vi.1992; *Longitarsus holsaticus* (L.), one swept from marsh lousewort in poorly-drained heathy pasture at Reilly, Crom Castle Estate, 28.v.1992; *Polydrusus mollis* (Strom), plentiful on fresh beech and hazel foliage in Collin Glen, Co. Antrim, 19.v.1992; *Magdalis armigera* (Fourc.), abundant on regrowth around base of dead elm in Castle Coole Park, Co. Fermanagh, 2.vi.1992; *Mesites tardii* (Curt.), widely found, in dead wood in woods and parks, and also in driftwood on seashore, in Counties Antrim, Armagh, Donegal and Fermanagh, v/vii.1992; *Notaris scirpi* (F.), widespread and plentiful along lough margins, Crom Castle Estate, Co. Fermanagh, 27.v, 1.vi.1992; *Orthochaetes setiger* (Beck), one swept from ground flora in sycamore woodland below heathy crags, Port Vantage, Downhill, Co. Londonderry, 9.vi.1992; *Litodactylus leucogaster* (Marsh.), Lough Coole, Castle Coole Estate, Co. Fermanagh, 2.vi.1992; *Eubrychius velutus* (Beck), swept in numbers from grazed margins of small lough at Corlatt, Crom Castle Estate, 27.v.1992; *Phytobius comari* (Herbst), Inishfendra Island, Crom Castle Estate, 28.v.1992; *Gymnetron villosulum* Gyll., swept from wetland at Crom Castle Estate, 26.v.1992.

Halstead, A.—(1) Some local Coleoptera taken in 1992. *Cicindela campestris* L., Braes of Foss, Mid Perth, 16.viii.92, a specimen lacking the usual yellow elytral spots. *Nicrophorus vespilloides* Herbst, Chobham Common, Surrey, 2.viii.92, swept. *Agrilus pannonicus* (Pill & Mitt.), Richmond Park, Surrey, 6.vi.92, on dead oak stump. *Platycis minutus* (F.), Chobham Common, Surrey, 9.viii.92, swept. *Abdera quadrifasciata* (Curt.), Richmond Park, Surrey, 6.vi.92, on fallen oak branches. *Asemum striatum* (L.), Witley Common, Surrey, 16.v.92, on Scots pine sapling. *Anisotoma humeralis* (F.), Chobham Common, Surrey, 12.vii.92, in fungus on fallen pine. *Byrrhus pustulatus* (Forst.), Witley, Common, Surrey, 16.v.92, swept off heather. *Melanophila acuminata* (Deg.), Chobham Common, Surrey, 12.vii.92, on burnt birch trunk. *Soronia punctatissima* (Ill.), Knaphill, Surrey, 30.vii.92, at m. v. light. *Mordellistena neuwaldeggiana* Panz., Knaphill, Surrey, 19.vii.92, on hogweed umbel. *Cryptocephalus parvulus* Müller O. F., Chobham Common, Surrey, 2.viii.92, swept off heather. *C. pusillus* F., Chobham Common, Surrey, 23.vii.92, swept. *Clytra quadripunctata* (L.), Falls of Leny, West Perth, 15.vi.92, swept. *Cassida vittata* de Villers, Mayford, Surrey, 1.viii.92, in polythene tunnel.

(2) Three exotic beetles brought to Wisley Garden. An unidentified tortoise beetle (Chrysomelidae) found dead on 10.viii.92 amongst the leaves of an air plant (*Tillandsia* sp.) being grown as a house-plant. Country of origin unknown. *Helenophorus collaris* L. (Tenebrionidae), received on 11.viii.92 from a holiday-maker from whose suitcase the beetle had crawled upon return from a holiday in Spain. *Lagocheirus undulatus* (Voet) syn. *obsoletus* (Thom.) (Cerambycidae), received on 15.ix.92; emerged from the stem of frangipani (*Plumeria* sp.) being grown as a pot plant. The plant was obtained as an uprooted cutting at Chelsea Flower Show in May 1992. The supplier was a firm called Roberta's of Shelbyville, Indiana, U.S.A. This species is able to make a squeaking noise when agitated.

Hoare, D. I. B.—Some interesting beetles found during conservation and survey work for the Hampshire and Isle of Wight Wildlife Trust during 1992, with a selection of others from various localities. *Carabus nitens* L., New Forest, South Hants., 26.iv.92, under stone. *Bembidion litorale* (Ol.), River Feshie, Easterness, 28.v.92, on sand. *Zabrus tenebrioides* (Goeze), Abbotstone Down, North Hants., 30.vii.92,

on *Pastinaca sativa* L. umbel. *Demetrias imperialis* (Germar), Lower Test Marshes, South Hants., 11.vii.92. *Cetonia aurata* (L.), Kynance Cove, West Cornwall, 6. vii.92, on *Rubus* flower. *Silis ruficollis* (F.), Lower Test Marshes, South Hants., 13.vi.92, on walkway. *Malachius marginellus* (Ol.) and *Anisosticta novemdecimpunctata* (L.), Lower Test Marshes, South Hants., 3.vi.92. *Coccinella quinquepunctata* L., River Nethy, Elgin, 27.v.92, on shingle. *Coccinella magnifica* (Redt.), Roydon Woods, South Hants., 25.vii.92, on *Pinus sylvestris* L. *Melandrya barbata* (F.), New Forest, South Hants., 31.v.92, on dead *Fagus* bough. *Rhagium inquisitor* (L.), Pass of Ryvoan, Easterness, 24.v.92, on *Pinus* log. *Leptura fulva* (Deg.), Lower Test Marshes, South Hants., 18.vii.92, on *Cirsium arvense* L. (Scop.) flower. *Metoecus paradoxus* (L.), North Baddesley Common, South Hants., 24.ix.92, on tree-trunk. *Clytra quadripunctata* (L.), Crab Wood, Winchester, South Hants., 14.vii.92, on *Salix*. *Cryptocephalus bipunctatus* (L.), New Forest, South Hants., 31.v.92, in ditch and on grass. *Plagiodera versicolora* (Laich.), Lower Test Marshes, South Hants., 3.vi.92, on *Salix fragilis* L. *Cassida murraea* L., Lower Test Marshes, South Hants., 11.vii.92. *Leptinotarsa decemlineata* Say, Western France, 12.ix.92, dead specimen on beach.

HODGE, P. J.—Fourteen species of Coleoptera, including four new to Sussex (*). *Pterostichus gracilis* (Dej.), Powdermill Reservoir, East Sussex, 28.vi.92. *Anisodactylus nemorivagus* (Duft.), Stagbury Hill, New Forest, South Hants., 10.iv.92. *Haliplus varius* Nicolai, Powdermill Reservoir, East Sussex, 17.ix.92, swept off *Polygonum* on mud-flats. *Paederus caligatus* Er., Stagbury Hill, New Forest, South Hants., 10.iv.92, in *Sphagnum*. *Atheta* (*Philhygra*) *debilis* (Er.), Powdermill Reservoir, East Sussex, 26.ix.92, swept. **Atheta* (*Philhygra*) *nannion* Joy, Combe Haven Level, East Sussex, 3.vii.91, in flood refuse. (This specimen was exhibited as *Atheta* (*Philhygra*) *debilis* (Er.) at the 1991 BENHS Exhibition on 26.x.91—*Br. J. Ent. Nat. Hist.* 5:74.) *Aphodius consputus* Creutz., West Hythe, East Kent, 17.x.92, in dyke. *Agriotes sordidus* (Ill.), Fishbourne, West Sussex, 23.iv.92, under tidal refuse. *Mordellistena humeralis* (L.), Stanmore Common, Middlesex, 29.vii.92, on *Angelica* umbel. *Gracilia minuta* (F.), Filborough Marshes, West Kent, 13.v.92, in dead stems of cultivated *Rubus*. *Macroplea appendiculata* (Panz.), Talkin Tarn, Cumberland, 6.vi.92. **Sitona puberulus* Reitt., Holman Wood, near Brede, East Sussex, 20.ix.92, on *Lotus pedunculatus* Cav. **Rhinoncus albicinctus* Gyll., Powdermill Reservoir, East Sussex, 17.ix.92, swept off *Polygonum* on mud-flats. **Lathrobium fennicum* Renk., Rye Harbour, East Sussex, 12.iv.92, in *Phragmites* litter in reed-bed, not previously recorded from British mainland, but known from Tresco in the Isles of Scilly.

KEY, R. S. AND R.—Beetles, mainly carabids, from Whitrigg Bridge on the Wampool Estuary, Kirkbride, Cumberland on 6.vii.92. *Dyschirius angustatus* (Ahrens), *D. globosus* (Herbst), *D. impunctipennis* Dawson, *D. nitidus* (Dejean), *D. politus* (Dejean), *D. salinus* Schaum, *Asaphidion pallipes* (Duft.), *Bembidion bipunctatus* (L.), *B. lunatum* (Duft.), *Agonum nigrum* Dejean, *Agathidium marginatum* Sturm, *Polydrusus pulchellus* Steph.

LOTT, D. A.—Scarce and interesting beetles from riparian and wetland habitats in the River Soar floodplain, Leics. and Notts., collected between 1982 and 1992. Species of *Atheta* (*Philhygra*) were mainly represented by females to show specific differences in the genital segment. *Blethisa multipunctata* (L.), *Clivina collaris* (Herbst), *Trechus discus* (F.), *T. micros* (Herbst), *T. secalis* (Payk.), *Bembidion obliquum* Sturm, *B. gilvipes* Sturm, *B. clarki* (Daws.), *B. fumigatum* (Duft.), *Tachys parvulus* (Dej.), *Pterostichus anthracinus* (Panz.), *P. gracilis* (Dej.), *Agonum livens* (Gyll.), *Acupalpus consputus* (Duft.), *Chlaenius nigricornis* (F.), *Helophorus nanus* Sturm, *Cercyon bifenestratus* Kuster, *C. marinus* Thoms., *C. tristis* (Ill.), *C. ustulatus* (Preys.), *Ochthebius bicolon* Germ., *Acrotrichus henrici* (Matth.), *Carpelimus* sp. indet.,

C. bilineatus Steph., *C. corticinus* (Grav.), *C. despectus* (Baudi), *C. elongatulus* (Er.), *C. gracilis* (Mann.), *C. impressus* (Bois. & Lac.), *C. lindrothi* Palm, *C. obesus* (Kies.), *C. pusillus* (Grav.), *C. rivularis* (Mots.), *C. similis* Smetana, *C. subtilicornis* (Roubal), *C. subtilis* (Er.), *C. zealandicus* (Sharp), *Platystethus nitens* (Sahl.), *P. nodifrons* (Mann.), *Anotylus insecatus* (Grav.), *Oxytelus fulvipes* Er., *Stenus argus* Grav., *S. carbonarius* Gyll., *S. nanus* Steph., *Lathrobium pallidum* von Nordmann, *L. ripicola* Czwalina, *Neobisnius villosulus* (Steph.), *Gabrius appendiculatus* Sharp, *G. bishopi* Sharp, *G. pennatus* Sharp, *Deinopsis erosa* (Steph.), *Myllaena* (?) *masoni* Matth., *Tachyusa coarctata* Er., *Gnypeta ripicola* (Kiesenw.), *G. velata* (Er.), *Brachyusa concolor* (Er.), *Schistoglossa gemina* (Er.), *Dochmonota clancula* (Er.), *Liogluta nitidula* (Kraatz), *Atheta (Philhygra) debilis* (Er.), *A. (P.) elongatula* (Grav.), *A. (P.) gyllenhali*, (Thoms.), *A. (P.) hygrobia* (Thoms.), *A. (P.) hygrotopora* (Kraatz), *A. (P.) luridipennis* (Mann.), *A. (P.) malleus* Joy, *A. (P.) melanocera* (Thoms.), *A. (P.) nannion* Joy, *A. (P.) volans* (Scriba), *Atheta (Dilacra) luteipes* (Er.), *Atheta basicornis* (Muls. & Rey), *Calodera uliginosa* Er., *Deubelia picina* (Aube), *Oxypoda exoleta* Er., *O. lentula* Er., *Fleutiauxellus quadripustulatus* (F.), *Ctenicera pectinicornis* (L.), *Selatosomus nigricornis* (Panz.), *Rhizophagus picipes* (Ol.), *Notaris bimaculatus* (F.), *Baris lepidii* Germar.

MALUMPHY, C.—A specimen of the red-spotted longhorn, *Batocera rufomaculata* (Deg.), (Cerambycidae), intercepted in the U.K. on imported crated goods from India on 24.viii.92 by M. Lole.

OWEN, J. A.—Some uncommon British beetles. *Tachys walkerianus* Sharp, Cobham, Surrey, ix.75, in flood debris by the River Mole; another example was taken at Brockenhurst, South Hants., in xii.89, also in flood debris. *Agonum quadripunctatum* (Deg.), Windsor Forest, Berkshire, v.80, one specimen under burnt log. *Agabus wasastjernae* Sahl., Abernethy Forest, Easterness, ii.92, in pool in pine wood. *Hister bisexstriatus* F., New Forest, South Hants., iv.92, crawling on grass. *Agathidium confusum* Bris., Headley, Surrey, v.90, in flight interception trap. *Eutheia formiceticola* Reitt., Windsor Forest, Berkshire, ii.89, in wood mould from old beech tree. *Microscydmus nanus* (Schaum), Headley, Surrey, vii.91, in flight interception trap. *Medon castaneus* (Grav.), Ripley, Surrey, i.91, in a mole's nest in a sandy area. *Scopaeus laevigatus* (Gyll.), Powdermill Reservoir, East Sussex, ix.92, two examples swept from vegetation over damp mud. *Tachyusa scitula* Er., bank of the Nethy, Elgin, vii.92, in pitfall trap in sandy area. *Meotica anglica* Benick, Ripley, Surrey, ii.89, in a mole's nest on sandy river bank. *Ampedus tristis* (L.), Rannoch, Mid Perth, vi.90, bred from a larva found in old pine stump; adult emerged in iv.91. *Globicornis nigripes* (F.), Windsor Great Park, Berkshire, vii.86, swept. *Nephus quadrimaculatus* (Herbst), Darenth, West Kent, viii.91, several beaten from ivy. *Ceutorhynchus parvulus* Bris., Bolberry Down, South Devon, v.92, on *Lepidium campestre* (L.) R.Br. *Pityophthorus lichtensteini* (Ratz.), Braemar, South Aberdeen, ix.91, bred from pine twigs; adults emerged in vi.92. *P. pubescens* (Marsh.) was exhibited for comparison with *P. lichtensteini*.

PARSONS, M.—A selection of beetles found in 1992. *Ampedus cardinalis* (Schiodte), *Agrilus pannonicus* (Pill. & Mitt.), *A. sinuatus* (Ol.) and *Opilo mollis* (L.) from Richmond Park, Surrey. *Ischnomera cyanea* (F.), *I. sanguinicollis* (F.) and *Donacia impressa* Payk. from Blenheim Park, Oxfordshire. *Pilemostoma fastuosa* (Schall.) from Westcott Downs, Surrey. *Ampedus sanguinolentus* (Schr.) from Lavington Common, West Sussex. *Rhynchites cavifrons* Gyll. from Orlestone Forest, East Kent.

PLANT, C. W.—Some examples of Hertfordshire beetles which are apparently local or rare in that county. *Microlestes maurus* (Sturm), Bishop's Stortford, TL 4820,

iv.88, in pitfall trap in lawn. *Colymbetes fuscus* (L.), Much Hadham, TL 4217, 29.vii.91 at m.v. light. *Nicrophorus interruptus* Steph. Tewin Orchard N.R., TL 2615, 30.vii.90, at m.v. light. *Philonthus atratus* (Grav.), Bishop's Stortford, TL 4820, ix.88, in garden malaise trap. *P. varius* (Gyll.), Bishop's Stortford, TL 4820, ix.88, in garden malaise trap. *Tachyporus pallidus* Sharp, Bishop's Stortford, TL 4820, 18.iii.89, in leaf litter in garden. *Stenagostus rhombeus* (Ol.), Stocking Wood, TL 4521, 22.vii.91, at m.v. light. *Pentarthrum huttoni* Woll., Bishop's Stortford, TL 4820, 15.v.88, tunnelling in bathroom skirting board.

SIMMONS, M. J.—A selection of beetles from Andorra.

HEMIPTERA

ALEXANDER, K. N. A. AND FOSTER, A. P.—A selection of the more interesting Heteroptera found during the National Trust's Biological Survey in Northern Ireland in 1992. All localities listed are National Trust land unless otherwise indicated. *Liorhyssus hyalinus* (F.), Murlough N. N. R., Co. Down, 20.v.92, single example by sweeping fore-dunes. *Pachybrachius fracticollis* (Schilling), Corraharra Lough, Crom Castle Estate, 27.v.92. *Neides tipularius* (L.), Murlough N. N. R., Co. Down, 21.v.92, one on dock on eroding fore-dunes; only one other Irish locality. *Metatropis rufescens* (H.-S.), Gole Wood, Crom Castle Estate, 1.vi.92; Rostrevor Oakwood (not National Trust land), Co. Down, 28.vi.92.

CHALMERS-HUNT, J. M.—*Ledra aurita* (L.), West Wickham, Kent, 8.viii.92, at m.v. trap in garden; det. M. D. Webb.

HODGE, P. J.—*Eurydema dominulus* (Scop.), Holman Wood, near Brede, E. Sussex, TQ7920, 20.ix.92, single examples swept from heathy woodland clearing by P. J. Hodge and D. A. Porter. *Megalonotus dilatatus* (H.-S.), Stagbury Hill, New Forest, S. Hampshire, SU2816, 10.iv.92.

KNILL-JONES, S. A.—Heteroptera from Freshwater, Isle of Wight. *Acanthosoma haemorrhoidale* (L.), 18.vi.83, 19.ix.91, 20.ix.91 & 11.x.91. *Elasmostethus interstinctus* (L.), 5.ix.91 & 11.ix.92, at m.v. trap. *Palomena prasina* (L.), 5.x.82, 16.vi.83, 9.xi.83, 17.viii.91 & 13.x.91. *Piezodorus lituratus* (F.), 6.x.83, 22.x.83 & 18.vi.84. *Pentatoma rufipes* (L.), 2.ix.91 & 18.ix.92, at m.v. light. *Coreus marginatus* (L.), 16.vii.83, in garden. *Callicorixa praeusta* (Fieb.), 26.viii.91, four from over 300 taken at m.v. trap. *Corixa punctata* (Ill.), 9.viii.91, m.v. trap.

HYMENOPTERA

ARCHER, DR M. E.—Some aculeate wasps and bees from Guernsey and Herm collected during 1991, many of which are scarce on the U.K. mainland. The U.K. distribution of *Evagetes siculus* and *Andrena agilissima* is confined to the Channel Islands. Pompilidae: *Evagetes siculus* (Lep.), Vazan Bay, Guernsey, 9.viii; *E. pectinipes* (L.), L'Ancresse, Guernsey, 4.viii; *Aporus unicolor* Spin., Pleinmont, Guernsey, 9.viii. and on Herm, 8.viii. Sphecidae: *Philanthus triangulum* (F.), 27.vii and 4.viii, *Nysson interruptus* (F.), 29.vii, *Gorytes laticinctus* (Lep.), 4.viii, *Argogorytes fargei* (Shuck.), 29.vii, all at L'Ancresse, Guernsey; *Tachysphex obscuripennis* (Schenck), Herm, 1.viii and Petit Bot, Guernsey, 2.viii; *Podalonia affinis* (Kirby), Pleinmont, Guernsey, 9.viii; *Diodontus insidiosus* Spooner, Lihon Head, Guernsey, 31.vii. Andrenidae: *Andrena agilissima* (Scop.), L'Ancresse, Guernsey, 27.vii; *A. fulvago* (Christ), Torteval coast, Guernsey, 30.vii. Halictidae: *Lasioglossum quadrinotatum* (Kirby), Torteval coast, 30.vii and Petit Bot, both Guernsey, 2.viii. Anthophoridae: *Anthophora retusa* (L.),

4.viii, *Nomada fulvicornis* F., 29.vii and *N. fucata* Panz., 4.viii, all at L'Ancresse, Guernsey. *N. fucata* was also taken at Cobo Bay, Guernsey, 29.vii.

HALSTEAD, A. J.—Some sawflies and other Symphyta taken in 1992, mostly in Scotland, by the exhibitor except where stated. Pamphiliidae: *Acantholyda posticalis* Matsumura, 16.vi, Skin Flats, near Grangemouth, Stirl. Siricidae: *Sirex cyaneus* F., found dead in an office, 25.vi, RHS Garden, Wisley, Surrey. Cimbicidae: *Trichiosoma sorbi* Hartig, 15.vi, near Falls of Leny, near Kilmahog, W. Perth. Tenthredinidae: *Heptamelus ochroleucus* (Steph.), 14.vii Damhead Wood, near Dollar, W. Perth. and col. A. Stubbs, 18.vi, Darnrig Moss, Stirl.; *Brachythops wuestnei* (Konow), col. E. Howe, 18.vi, Mugdock Wood near Glasgow, Stirl.; *Heterarthrus microcephalus* (Klug), 2.viii, Chobham Common, Surrey; *H. nemoratus* (Fall.), 19.vi, Loch Leven, Fife; *Empria immersa* (Klug) 17.v, Chobham Common, Surrey; *Ardis brunniventris* (Hartig), col. A. Godfrey, 14.vi, Burntisland—Kirkcaldy coast, Fife; *Tenthredo balteatus* Klug, 18.vi, Water of Ruchill, Auchnashelloch, Mid Perth., and col. A. Godfrey 16.vi, Stronvar Marshes, W. Perth.; *Tenthredo moniliata* Klug, 20.vi, Auchenbowie Burn, north of Loch Coulter Reservoir, Stirl.; *Nematinus acuminatus* (Thom.), 15.vi, near Falls of Leny, near Kilmahog, W. Perth.; *Croesus varus* (Villaret) and *Pristiphora testacea* Jurine, both 2.viii, Chobham Common, Surrey; *Nematus flavescens* Steph. and *N. reticulatus* Holmgren, both 17.vi, Ben Lawers, mid Perth. *N. reticulatus* was also taken by E. Howe, 19.vi, Tomdachoille Island, River Tummel, E./Mid Perth.

HODGE, P. J.—A specimen of the sphecid wasp *Philanthus triangulum* (F.), sometimes known as the bee wolf as it preys on honeybees. The specimen was taken at Lodge Marsh Dunes (part of Holkham N.N.R.), Wells-next-the-Sea, W. Norf. on 10.viii.92. This is the most northerly record in Britain for this scarce species.

SIMMONS, M. J.—Some sawflies and other hymenoptera taken in Andorra in late July–early August 1991. These included *Arge nigripes* (Retz.), *A. ustulata* (L.), *Rhogogaster viridis* (L.), *Tenthredo notha* (Klug) and *T. arcuata* Forst.

UFFEN, R. W. J.—Photographs and pinned specimens showing the same aculeate community nesting in dumped gravel and builders' debris on the floor of a chalk pit at Harefield, Middx., as in the natural gravel capping stratum. A strong colony of the halictid bee, *Lasioglossum parvulum* (Schenck) was accompanied by the cleptoparasitoids *Nomada fabriciana* (L.), *N. marshamella* (Kirby) and *N. flava* Panz. The fly *Bombylius major* L. was seen laying eggs in the general area of the *Lasioglossum* burrows on 13.v.92.

NEUROPTERA

PLANT, C. W.—Two lacewings of the Chrysopidae family: *Nothochrysa fulviceps* (Steph.) from Nagyoldal, Hungary, 28.viii.81 and *N. capitata* (F.) from Denham, Bucks, 11.viii.80. The latter is relatively common but *N. fulviceps* has not been recorded in Britain since 1958. It resides in tree tops so may have been overlooked. The two species may readily be distinguished by the yellow thoracic stripe and bright orange head of *fulviceps* (Plate II, Fig. 12), while *capitata* has a uniformly brown thorax and paler head.

SIMMONS, M. J.—Two neuropterans collected in Andorra in 1991: *Mantispa styriaca* and *Neuroleon nemaiisiensis*.

ORTHOPTERA AND PHASMIDAE

CRONIN, A. R.—Specimens of an unidentified cricket and leaf insect found in a coco plantation at San Pablo, Philippines, October 1991.

HALSTEAD, A. J.—Last year's live exhibit of an unidentified praying mantis pinned to show the colourful hind wings. The mantis was found as a final instar nymph on orchids imported into Britain from Thailand in July 1991.

MALUMPHY, DR C.—A live specimen of the Egyptian grasshopper *Anacridium aegyptium* (L.) (Orthoptera: Acrididae) found at Sheerness Docks on a lorry from Germany on 28.x.92.

MYRIAPODA

LONSDALE, D., CARTER, C. AND TAIT, H.—A freeze-dried specimen of the centipede *Scutigera coleoptrata* (Scutigeromorpha: Scutigeridae) found in a house at Alton, Hants., on about 4.ix.92. This is believed to be only the fourth record for the UK mainland of this mainly southern European species. It is established on the Channel Islands from where it may have travelled with cut flowers. While alive it readily fed on first instar nymphs of the stick insect *Carausius morosus*. It frequently cleaned all its legs, using its mouthparts and working in strict sequence from front to rear.

ILLUSTRATIONS

HARLEY, B.—Exhibit of illustrations by Richard Lewington (colour photocopies only) of plates 1–3 Yponomeutidae for volume 3 of *Moths and butterflies of Great Britain and Ireland*. Also included were monochrome figures of coleophorid cases, *C. argentula* Steph., *C. vibicella* Hübn. and *C. onosmella* Brahm.

MURPHY, F.—Photographs of spiders from South East Asia.

PORTER, J., CHURCH, S. H. AND SKINNER, B.—Photographic illustrations of over 815 different larvae of British Macrolepidoptera. The results of 12 years work, about 25 more species are required to make the work complete to include all indigenous and regular migrants.

SKINNER, B. AND ELLIOT, B.—Photographs showing larvae, pupae and habitat of *Eublemma ostrina* Hübn. found in flower heads of carline thistle in the Burren, Co. Clare and on Inisheer, Aran Islands, Co. Galway during August, 1992.

SOFTLY, R. A.—(1) Slides of species recorded at actinic light, once only during 1979–1992. *Thera juniperata* L. 20.x.85, a species known to support colonies widely on garden juniper. *Chesias rufata* F. 27.iv.86, the food plant, broom, grows sparsely on Hampstead Heath. *Hydrelia flammeolaria* Hufn., 11.vii.82 at Kenwood, the foodplant, field maple may be a survivor where it is found in ancient hedges on Hampstead Heath, but it has recently increased as a planted species. *Acasis viretata* Hübn. 18.v.82 at Kenwood, there is no shortage of the foodplant, stated to be flowers of holly and ivy etc. *Celaena leucostigma* Hübn., 13.viii.86, foodplant: yellow iris etc. *Rhizedra lutosa* Hübn., foodplant: common reed. The last 2 species could conceivably maintain populations among sparse stands of their foodplants that persist on the margins of some of the Hampstead Heath ponds. All the above are new records for the North London Heights (with the exception of the last, which according to De Worms was noted by Andrewes at Highgate in 1911).

(2) Coloured slides of the following species from Alderney in the channel Islands: *Thera cupressata* H.G., 28.ix.92; *Leucochlaena oditis* Hübn., 27.ix.92, one of the several trapped in England very local on the south-west coast; *Mythimna vitellina* Hübn., 28.iv.92, one of several trapped, a well known immigrant to Britain that is

probably resident on Alderney; *Chloroclysta truncata* Hufn. 26.ix.92, other more normal darker examples of the species were seen. This resembled the light specimens known from Scotland. The above are among the more noteworthy of 55 species of moths recorded of Alderney 21.ix to 2.x.92.

UFFEN, R. W. J.—*Norellia spinipes* Meig. (Diptera: Scathophagidae): photographs of tenanted larval mines in wild daffodils, Cave Wood, Woolmer Green, Herts., 16.v.92.

WARING, P.—National Recording Network and Atlas Project for Britain's rarer macro-moths. A display showing sample maps and text for the forthcoming atlas.

PLEA FOR A PHOTOGRAPHER

The Society is indebted to Mr David Wilson for photographing specimens at the Annual Exhibitions over many years, that colour plates could be published in the Journal. These plates have contained many rare species and unusual variations and aberrations not previously figured in the literature. The high quality of the photographs, and hence the resulting plates, has enhanced the reputation of the Journal and of the Society.

After having carried out the task of 'official photographer' for some time, David would like to hand this duty over to a successor for the 1993 and subsequent Annual Exhibitions. Anyone feeling that they have the equipment and sufficient experience to continue David's work are asked to contact him, or alternatively to contact the Editor, Richard A. Jones, 13 Bellwood Road, Nunhead, London SE15 3DE. Tel: 071 732 2440.

Plate III. ANNUAL EXHIBITION 1992

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1: *Charanyca trigrammica*, Slough, Bucks., 5.vi.92, R. Hayward. 2: *Calamatropha paludella*, f. *nivella*, Rushey Mead, Essex, 29.vi.92, C. W. Plant. 3: *Eupithecia sinuosaria*, Rothamsted, Harpenden, Herts., 21.vi.92, A. Riley & M. Townsend. 4: *Lampropteryx otregiata*, Dinas near Harlech, Gwynedd, 5.viii.92, R. McCormick. 5: *Lasiocampa quercus* gynandrous, bred, Eastbourne, 17.viii.92, A. Harbottle. 6: *Hypsopygia costalis*, Niton, I.o.W., 29.vii.92, S. Knill-Jones. 7: *Aspitates ochrearia*, Dungeness, Kent, 4.v.90, B. Elliott. 8: *Heliothis nubigera*, Swanage, Dorset, 14.v.92, B. Skinner. 9: *Earias insulana*, St Austell, Cornwall, 13.vi.92, W. Kittle. 10: *Eublemma ostrina*, bred, Co. Clare, ix.92, B. Skinner. 11: *Elophila nymphaeata*, Matley Bog, New Forest, Hants., 15.iv.92, B. Skinner. 12: *Orthosia cruda*, Hamstreet, Kent, 10.iv.92, S. Clancy. 13: *Pempeliella ornatella*; Burren, Co. Galway, 22.iv.90, B. Skinner. 14: *Spargania luctuata*, Warehorne, Kent, 4.viii.90, A. Riley & M. Townsend. 15: *Lomaspilis marginata*, Keilder, Northumb., 26.vi.88, A. Riley & M. Townsend. 16: *Philudoria potatoria*, ab. *bicolor* Stonelees, Kent, 10.vii.92, R. McCormick. 17: *Arctia villica*, Dungeness, Kent, 1.vi.92, M. Parsons. 18: *Crocallis elinguaria*, Smitterfield, Warwickshire, 3.viii.91, A. Kolaj.

Photo: D. E. Wilson

Plate III. ANNUAL EXHIBITION 1992

BENHS INDOOR MEETINGS

13 October 1992

The President, Dr J. MUGGLETON, announced the death of Ted Wild, a former Secretary of the Society, and of Mr Ian Bolt.

Mr I. FERGUSON showed some leaves of the ornamental shrub *Leycesteria formosa* Wallich found growing as a garden escape at Heathfield Country Park, near Croydon. These had mines believed to have been made by caterpillars of *Phyllonorycter emberizaepenella* (Bouch.) (Lepidoptera: Gracillariidae). This species is mainly found on honeysuckle and other related plants, including snowberry. According to Watkinson in *Moths and butterflies of Great Britain and Ireland* Vol. 2, it is widely distributed but local and rarely common.

Mr M. J. SIMMONS showed a dwarf specimen of the silver-Y moth referable to the form *Autographa gamma* ab. *gammina* (Staud.) taken at light in Crowborough, East Sussex, on 25.viii.90. In *Moths and butterflies of Great Britain and Ireland* Vol. 10, Heath *et al.* state that the wingspan of normal *A. gamma* is 40–48 mm while that of *gammina* is 30–35 mm. The specimen exhibited had a wingspan of 28–30 mm. Russell Bretherton, through breeding experiments, has suggested that this form is the result of starvation during the larval period.

Dr R. MORRIS displayed a copy of the newly published book *Habitat management for invertebrates—a practical handbook* by Peter Kirby. It is published by the Royal Society for the Protection of Birds and is available at £9 + £2.50 postage from the Conservation Management Advisory Service, RSPB, The Lodge, Sandy, Bedfordshire SG19 2DL. The book is intended to help people recognize and conserve habitat features that are important to invertebrates in general, rather than concentrating on the needs of specific rarities.

The names of Michael Christopher Brian, Martyn Hnatilik, Barbara Last, Heather S. McHaffie, Peter Sharpe and Mark Grindon Telfer were read for the second time and they were duly elected as members.

Mr M. SIMMONS reminded members of the forthcoming Annual Exhibition. The President said there was still time to book places for the Dinner but applications must be sent to Dr MacNulty as soon as possible.

Dr J. MUGGLETON said that David Agassiz had been in contact with some French entomologists with a view to holding exchange field meetings. A meeting in France to view collections has been provisionally arranged for late November. Further details would be available at the Annual Exhibition. A new Christmas card depicting the Apollo butterfly designed by Rob Dyke would be on sale at the Exhibition.

Dr Muggleton also announced that the Society's building at Dinton Pastures would be open on the Sunday after the Exhibition, by which time it is hoped the collections will have been installed.

Mr M. SIMMONS, referring to Mr Halstead's remarks at the previous meeting on the abundance this year of elephant hawk moth larvae, said that an unknown entomologist had attracted up to 100 moths of this species when he ran a light on the South Downs one night during the summer. The buff arches, *Habrosyne pyritoides* (Hufn.), and lunar underwing, *Noctua orbona* (Hufn.), had also been very common in Mr Simmons's garden at Crowborough.

Dr I. MCLEAN said that at the Dinton Pastures field meeting he had taken two scarce sciomyzid flies, *Colobaea punctata* (Lundbeck) and *Sciomyza simplex* Fallén, in a partly dry reedy pool close to the Society's building. This indicates that the Country Park has an interesting entomological fauna, despite the newness of much of the habitat.

Mrs F. M. MURPHY said that the large spider found attacking a moth in the light trap had been *Tegenaria gigantea* Chamberlin and Ivie.

Mr S. MILES said he had seen two clouded yellow butterflies at a landslip near Sidmouth, Devon, in July.

Dr J. MUGGLETON said that the spider he had shown at the previous meeting had now been correctly identified by Mrs Murphy as *Latrodectus tredecimguttatus*. This is a type of black widow spider found in southern Europe which has a common name in France of 'malmignette' or 'the evil one'.

Dr ANDREW CHERRILL described the work he had carried out during 1987–90 on the wart-biter cricket (*Decticus verrucivorus* (L.)). This has always been a rare insect in England and has declined to the point where it has been recorded from only three 10-km squares in the 1980s. It is widespread in Europe but it has also declined in northern France, Holland and Scandinavia. In Britain it is confined to some chalk grassland sites in Sussex and Wiltshire and a heathland site in Dorset. On the continent it is able to colonize a much wider range of habitats. British specimens are about 10% smaller than the Continental forms and show less colour variation, being predominantly green.

Dr Cherrill's studies had four main aims. These were:

1 to identify and study aspects of the wart-biter's ecology relevant to its conservation;
2 to make recommendations for habitat management;
3 to devise means of monitoring the size of populations, and
4 to investigate captive breeding for possible release at suitable sites.

The main study area was at Castle Hill NNR in East Sussex. Transects were marked out up the side of the valley slope and the habitat was classified into six vegetation types—(1) short species-rich turf, (2) longer species-rich turf, (3) small tussocky grass, (4) large tussocky grass, (5) continuous tall grass and (6) ruderal plants of disturbed ground.

During the summer months measurements were taken along the transects to assess wart-biter numbers and their associations with plant types. The smaller instars i–iv were counted with the aid of box quadrats while the adults and later instars were counted by eye. This showed that the first instar nymphs were found mainly in the short turf, which is where females tend to lay their eggs. Nymphal stages ii–iv were found mainly in the longer species-rich turf with instar iv tending to increase in the small tussocky areas. Instars v to adult also showed this distribution with an increasing tendency to occupy the tussocky areas.

Population counts showed that there was a high mortality rate amongst the early nymphal instars. Hot summers allow the insect to reach the adult stage earlier and this results in a longer oviposition period. Analysis of weather records and population counts, made at the site in earlier years by Chris Haes, suggests that there is a direct correlation between adult numbers and the hours of summer sunshine two years previously, when the eggs from which those adults developed would have been laid. At least 700 hours of sunshine between 1 July and 14 October are needed to give a good adult population. The captive breeding programme at London Zoo has been successful and it is possible that some releases may be made in 1993.

In the discussion that followed the lecture, Roger Key of English Nature gave an update on the wart-biter's current status. A new colony has been found in Sussex and the Dorset colony has been rediscovered after an apparent absence of two or

three years. Wart-biters have not been seen at the Wiltshire site recently and it may have been lost from that site.

The habitat management scheme devised by Dr Cherrill has been put into operation and as a consequence it is anticipated that 1993 will show an increased population of wart-biters at Castle Hill.

9 November 1992

Mr A. J. HALSTEAD showed some live and pinned specimens of the plant bug *Ischnodemus sabuleti* (Fallen) (Hemiptera: Lygaeidae). They were sent to the exhibitor on 29.x.92 from a private garden in Higham Ferrers, Northants, where they were said to be present in 'literally millions and millions on all the plants'. This bug became established in Britain during the last century and is now widespread in southern England. It feeds by sucking sap from grasses and reeds in damp places but moves to drier situations in the autumn to seek overwintering sites. The adults can have fully developed wings, or wings that cover only a third, or about 90% of the abdomen. All three types were present amongst the specimens displayed.

Mr R. Softly showed some fly larvae (Diptera: Bibionidae) found in large numbers in leaf litter on Hampstead Heath on 7.xi.92. He noted that the St Mark's fly, *Bibio marci* (L.), had been abundant earlier in the year.

The name of Dr C. Malumphy was read for the second time and he was duly elected as a member.

There then followed a discussion of the Annual Exhibition.

The exhibition organizer, Mr M. SIMMONS, reported that attendance was down according to the number of names in the attendance book but that the number of exhibits was about the same as previous years. The event had gone smoothly apart from a problem with the lighting and a shortage of sandwiches at lunchtime. Dr Muggleton said that attendance at the Dinner had fallen to 32 persons and was about half the number attending two years ago. The cost of the Dinner was thought to be a factor and consideration would be given to this by Council. Mr Softly enquired about facilities for displaying colour transparencies. It was felt that these could be used to greater advantage at the slide evening traditionally held at the first indoor meeting after the Exhibition, and that colour prints were a better photographic medium for the Exhibition. Mr Softly also asked if a microscope could be provided for viewing some of the smaller exhibits. The possibility of specimens being damaged would probably make this unpopular with exhibitors. Mr Softly noted that in the exhibit on a mapping scheme for moths of the Elachistidae family, vice county 21 (Middlesex) was often a blank area for many species and he urged entomologists operating in that area to make greater efforts to report their records.

Various members then showed slides.

Dr I. MCLEAN showed several examples of flies, mostly with patterned wings, especially in the families Tephritidae, Otitidae and Platystomatidae. He also showed slides of male orange-tip butterflies feeding on hedge garlic flowers, a larva of the green hairstreak, *Callophrys rubi* (L.), feeding on purging buckthorn, the orange ladybird, *Halyzia 16-guttata* (L.) and a *Clubonia* sp. spider with what was probably a pathogenic white fungal growth. He closed his display with some pictures taken at the inaugural field meeting held at Dinton Pastures in October.

Mr N. A. CALLOW showed a wide range of flies, Lepidoptera, beetles, ants, aphids, solitary wasps, bees, other insects and spiders. Some slides showed aspects of insect behaviour, such as ants attending aphid colonies, the potter wasp *Eumenes coarctatus* (L.) gathering sand grains for nesting material, and twelve chalk hill blue butterflies, *Lysandra coridon* (Poda), feeding on a piece of fox(?) dung. One slide which

aroused particular interest showed a female chironomid midge apparently attending aphids on runner bean leaves to obtain honeydew, a habit not normally shown by this type of fly.

Mr R. SOFTLY showed a slide of the juniper carpet moth taken at light on Hampstead Heath, and of the cypress carpet taken on Alderney in late September.

Dr J. MUGGLETON showed slides taken during his recent holiday in S.E. Spain. Despite the arid nature of the mountains and plains there was plenty of insect life to be seen. He showed slides of some of the local flora and some of the invertebrate animals seen, including spurge hawk moth larvae, black widow spiders, scorpions, praying mantids, crickets and grasshoppers, oil beetles, weevils, solitary bees and Neuroptera. One slide showed leaf beetles, *Timarcha* sp., found crawling on snow at more than 10 000 ft up the mountains.

Mr M. HENDERSON showed slides of beetles, particularly carabids, dung and carrion beetles, and the longhorn beetle *Arhopalus rusticus* (L.) found while carrying out surveys on Wimbledon Common and Chobham Common. He also showed slides that gave details of the structure and biology of carrion beetles.

8 December 1992

The President, Dr J. MUGGLETON, announced the death of Mr L. E. Couchman of Tasmania. Mr Couchman had joined the Society in 1922, over 70 years ago and had been the Society's longest standing member.

Dr I. F. G. MCLEAN showed some winter gnats (Diptera: Trichoceridae) under the title 'as old as dinosaurs'. The two species, *Trichocera major* Edw. and *T. annulata* Meig. are active as adults during the winter months, as their English name suggests. An ancient relict group of flies belonging to the suborder Nematocera, they are believed to have originated in the lower Jurassic, from ancestors of craneflies and their allies—the Architipulidae. The relationship of the Trichoceridae to the other families of Nematocera remains controversial, nevertheless flies much like modern winter gnats have persisted through the Jurassic and Cretaceous, surviving into the Tertiary and Quaternary until the present, long after the demise of the dinosaurs.

Mr A. J. HALSTEAD showed an apple scarred by the activity of the apple sawfly, *Hoplocampa testudinea* (Klug) (Hymenoptera: Tenthredinidae). Usually a newly hatched larva tunnels just beneath the surface of the apple fruitlet before burrowing into the core. Fruitlets damaged in this way fail to develop. Sometimes, as in this particular case, the larva dies before burrowing into the apple and the fruit develops with a broad ribbon-like scar running half way round the fruit.

The names of Dr C Martin Drake and Donald Arthur Humphrey were read for the second time and they were duly elected members of the Society.

Dr J. MUGGLETON announced that the Society's new headquarters at Dinton Pastures was to be called the Pelham-Clinton Building, in honour of the late 10th Duke of Newcastle, E. C. Pelham-Clinton, whose bequest to the Society had made the building possible. Dr Muggleton also thanked Mr A. J. Halstead, through whose approach to various charitable trusts the Society had received two large donations. These were £2000 from the William C. Cadbury Trust and £10 000 from the Esmée Fairbairn Trust.

Dr Muggleton went on to report on the meeting organized with French entomologists in Rouen on 28/29 November 1992. Dr Muggleton and other members of the Society were hospitably entertained, and a further international meeting had been tentatively arranged for 29/30 May 1993 when it was hoped members of the French entomological societies would visit Dinton Pastures.

Mr A. J. Halstead reported seeing two specimens of *Sympetrum striolatum* (Charp.) (Odonata: Libellulidae) basking in sunshine on Wisley Common, Surrey on 13.xi.92, and another on a wall at Wisley Garden. The species is noted for being one of the last seen in the autumn.

Dr David Norman, Director of the Sedgwick Museum, spoke on 'Professor Richard Owen and the first complete dinosaur'. Owen was a leading comparative anatomist during the first half of the 19th century. At this time fossil bones were rare and difficult to interpret. Nevertheless various bits and pieces of fossil dinosaurs had been found and often named on the basis of single bones. Such was the understanding of comparative anatomy at this time that experts such as Owen could recognize even incomplete bone fragments and make judgements about the size, shape and habits of the creatures from which they came.

Georges Cuvier, in France, had established the principles of comparative anatomy during the early 1800s. He described some of the first fossil giant reptiles—huge jaws and teeth from a gigantic monitor lizard from the Cretaceous. He knew it was extinct, but recognized its relation to living creatures. This recognition brought with it two revolutionary conclusions, that extinction had occurred during the long history of the Earth and the existence of truly giant fossil creatures. Further fossil discoveries fuelled the appetites of both experts and public alike. Mary Anning of Lyme Regis made a career of collecting and selling fossils, including Ichthyosaurs and Plesiosaurs. William Buckland found Megalosaurus, the first discovered land-dwelling dinosaur. Gideon Mantell subsequently discovered Iguanodon, another land-dweller.

At this time, all material was submitted to the great Cuvier for his opinion, and his opinion was that these long extinct creatures were giant lizard-like animals.

In 1837 Owen was given a grant of £1000 from the British Association for the Advancement of Science to review all that was then known about the dinosaurs. Although he recognized the affinities with living reptiles, he also perceived that these huge beasts were not slim and delicate like modern reptiles, but heavy and stout, much more like modern mammals.

This idea of what dinosaurs looked like led him into rivalry with other comparative anatomists who had their own ideas. In the mid-1850s a series of discoveries in North America of large upright creatures with large hind legs but small front legs, some three-toed like birds, argued against any progression towards mammal-like animals.

In 1858, the discovery of a few bones of a new dinosaur led to the publication of a new name—Sceleidosaurus. Other bones from this dinosaur were soon found, and very shortly an almost complete, well-preserved skeleton, including the skull, was discovered. Here was a huge, heavy, stout, four-footed beast in almost perfect condition to support Owen's ideas. But instead of grandly publishing his results and admonishing his opponents, Owen simply described the bones in boring and turgid style, merely fiddling around with dry descriptions. Although he could have defended his arguments, the normally vociferous Owen remained mute, laying himself open to ridicule for over 20 years. Instead of using his knowledge to draw conclusions about what dinosaurs looked like, interpreting how they lived and died, Owen retreated from the intellectual frontiers, becoming a simple descriptive palaeontologist.

The original skull of that first complete dinosaur is now being examined by modern palaeontologists, using techniques not available to Owen such as paring out the bones in acid. This particular method is slowly revealing that even today, over a century later, the first complete dinosaur remains one of the best preserved fossils known.

12 January 1993

The President, Dr J. MUGGLETON, announced the death of Mr D. A. Neal of Pevensey Bay, Sussex.

Mr A. J. HALSTEAD showed a specimen of a click beetle *Ampedus elongantulus* (F.) (Coleoptera: Elateridae) collected by sweeping in deciduous woodland at Witley Common, Surrey, on 16.v.92. This scarce beetle has "notable A" status and is widely scattered in southern England. It is regarded as an ancient woodland insect with larvae developing in red-rotten wood of oak, beech and pine.

The names of William Edward Dixon, Michael George Pennington, Mrs Shirley Rook, Raymond Trevor Wheeler and Guy Willson were read for the second time and they were duly elected as members.

The President announced that he had received a letter to say that serious illness was causing Mr B. S. Burns to resign his membership. Dr Muggleton also pointed out an error in the list of meetings as printed on the membership card. The AGM was to be held on Monday, 22 February, and not on the 9th as printed. He reported that the meetings held at Dinton Pastures in November and December had proved successful, with an average attendance of 15–16 members and guests. This compared with attendances of about 2–3 people when similar meetings were held at the Alpine Club. Further meetings at the Pelham-Clinton building would be held on a regular basis on the second and fourth Sundays in the month, starting from the fourth Sunday in January.

Mr R. SOFTLY noted that mild weather in early January had brought out early noctuid moths at Hampstead, including *Conistra vaccinii* (L.), the chestnut, and *Eupsilia transversa* (Hufn.), the satellite.

Mr M. SIMMONS said that these moths had also come to his light trap at Crowborough, Sussex. He had also taken *Poecilocampa populi* (L.) on 6.i.93, which is a late date for this lasiocampid moth. He also asked if anyone could provide him with information on the life cycle and habits of the east European notodontid moth *Odontosia sieviersi*.

Dr STEVE COMPTON spoke on the subject of "Africa, wasps and figs", in which he gave an account of the relationships between South African figs and the chalcid wasps that develop inside the fruits. His research had mainly centred on *Ficus burtt-davyi* which grows in arid semi-desert areas and has a specific chalcid pollinator, *Elisabethiella baijnathi*. Figs have unusual pollination arrangements because the floral parts are concealed within the developing fruits. There is a small opening, or ostiole, at the tip of the fruit through which pollen-bearing insects can enter. The fruits go through five phases as they develop. There is the initial prefemale stage when the fruit begins to form. During the female stage, the ostiole opens, allowing access to the female flowers that have developed inside the fruits. This is followed by the inter-floral period when seeds and chalcid wasp larvae develop. The next stage is the male phase when male flowers produce pollen which is picked up by the emerging adult insects. Male chalcids join forces to chew a hole in the side of the fruit, allowing the mated females to disperse. The final phase is when the fruit ripens. Female wasps are only attracted to the fruits during the female phase of fruit development. There is an as yet unidentified attractant scent produced by the fruits during this period. Research has shown that different fig species produce different scents and as a result they tend to have specific species of chalcid wasps as pollinators. Closely related figs are pollinated by closely related chalcids, indicating a long period of co-evolution. Female chalcids have mandibular plates on the undersides of their heads which help them squeeze through the ostiole. There is a direct relationship between head shape and

the size of the fruits, the length of the head increasing in fig species with larger fruits. Several species of chalcid may develop inside a fig; some feed on the flowers, others cause galls or develop as inquilines inside galls. The male chalcids are usually wingless and have reduced antennae and eyes. Mating takes place mainly within the galls or in the fruit's central cavity. Some species have winged males and these tend to mate outside the fruits. Those species which mate inside the fruit's cavity tend to have larger and more aggressive males than those that mate in the galls or outside the fruit. One chalcid species produces two male morphs; the smaller form mates outside the fruit while the larger and more aggressive form mate inside the fruit cavity, where fighting takes place between males of the same species.

BENHS FIELD MEETING

Symonds Yat and Wye Gorge, 13 September 1992

Leader: **K. N. A. Alexander**. This joint meeting with the Gloucestershire Invertebrate Group was memorable for two reasons: the appalling persistent rain which plagued the morning and deterred many members from attending, and the discovery of two species new to Gloucestershire during the afternoon.

The morning was spent in Elliots Wood, on the steep east-facing side of Huntsham Hill (actually in Herefordshire). This proved to be a rich area, the woodland being of an ash/field maple/wych elm/hazel composition, with small-leaved lime and yew, and overlying limestone. A good variety of species were found, although nothing exceptional. The more interesting finds were the millipede *Craspedosoma rawlinsii* Leach, the woodlouse *Haplophthalmus danicus* Budde-Lund, the harvestman *Dicranopalpus caudatus* Dresco, the bristletail *Dilta hibernica* (Carpenter) and the snail *Zenobiella subrufescens* (Miller). The rain made examination of leaf-mines a more productive exercise than sweep-netting, and species noted include the moth *Phyllonorycter coryli* (Nic.) on hazel and the fly *Phytomyza scolopendri* Rob.-Des. on hart's-tongue fern.

After lunch, we worked along the top edge of the gorge cliffs south and west from Symonds Yat Rock, as far as The Slaughter, and were rewarded by some excellent finds. The vegetation along these clifftops is a remarkable mix, with a thin scatter of old oaks and beeches, rampant wild service tree, whitebeam, wayfaring tree, yew, privet, small-leaved lime, wild madder, saw-wort, and so on. The first notable find was of the remains of the rare beetle *Conopalpus testaceus* (Ol.) in a dead and decaying lower bough of an old oak. Larvae of another old tree beetle *Ctesias serra* (F.) were present beneath loose bark on a dead beech hulk standing in a small glade. Searching beneath loose bark on a fallen dead branch, probably beech, above The Slaughter, revealed a number of small, prettily marked *Armadillidium* woodlice. These did not look right for the scarce *A. pulchellum* (Zencker) (which is only known in Gloucestershire from two small areas of the Forest of Dean), and a sample was accordingly retained for closer examination. They appear to be the very rare *A. pictum* Brandt, which hasn't previously been found in the county, but this record must await expert confirmation.

The examination of leaf-mines continued in the afternoon, and *Stigmella* mines collected from wild service have since proved to be what is presently known as *S. mespilicola* (Frey), which was first found in Britain several years ago by Michael Harper and Tony Simpson at The Doward (Emmett, pers. comm. to Roger Gaunt). The Doward lies on the opposite side of the Wye Gorge, in Herefordshire, and so this is a new county record, albeit in the same 10 km square.

SHORT COMMUNICATIONS

A *Clubiona* spider infected with a parasitic fungus.—On 22.ix.1992 while undertaking counts of large copper butterfly (*Lycaena dispar* (Haworth) (Lepidoptera: Lycaenidae)) eggs and larvae at Woodwalton Fen NNR, V. C. Huntingdonshire (TL 231846) a single female *Clubiona* (Araneae: Clubionidae) was found on a dried leaf of great water dock (*Rumex hydrolapathum* Hudson). This spider was infected with a parasitic fungus (see Plate IV, Figure 1), with distinctive chalky white processes emerging from the body and legs. Dr A. G. Irwin (Norwich Castle Museum) has kindly identified the fungus as *Gibellula aranearum* (Schw.) Syd. (Moniliales: Stilbaceae) a common species on spiders in fens and meadows (Ellis, 1956; Petch, 1948). Tony Irwin tells me that recent opinion is that *Gibellula* may be a non-conidial form of *Torrubiella* (Ascomycetes, Sphaeriales: Clavicipitaceae) which is also known as a spider parasite.

I am grateful to Tony Irwin for his determination of the fungus, for background information and for the literature references cited.—I. F. G. McLean, 109 Miller Way, Brampton, Huntingdon, Cambridgeshire PE18 8TZ.

References

Ellis, E. A. 1956. Entomogenous fungi in Norfolk. *Trans. Norfolk and Norwich Naturalists' Soc.* **18(3)**: 23–28 + 11 plates.

Petch, T. 1948. A revised list of British entomogenous fungi. *Trans. Br. Mycol. Soc.* **31**: 286-304.

A chironomid midge 'milking' aphid honeydew?—On 30.vi.1992, I took a series of photographs of a chironomid midge on the underside of a leaf of runner beans in my garden in Surbiton, Surrey. The fly was moving slowly and awkwardly over and around the aphids which were feeding on the central vein of the bean leaf. It appeared that the midge was attracted to the aphids, possibly by the sugary substance that they produce. Observations were made through the SLR viewfinder which is not ideal for this purpose, particularly when trying to maintain focus on the insect. It would appear from the photograph (Plate IV, Fig. 3), that the midge might have been extending its front legs forward much as an ant's antennae when it is stroking aphids in its attempt to 'milk' them—N. A. Callow, 25 Cranes Park Avenue, Surbiton, Surrey KT5 8BS.

Plate IV.

1. A *Clubiona* spider infected with a parasitic fungus. I. F. G. McLean. 1993. *Br. J. Ent. Nat. Hist.* **6**: 88. Olympus OM4Ti, fitted with Olympus 80 mm, f4 macro lens on bellows, using an Olympus T28 twin-head macro flash and Agfa CT100 colour reversal film.

2. Antennal cleaning behaviour in *Vespula germanica* (F.) (Hymenoptera: Vespidae). N. A. Callow. 1993. *Br. J. Ent. Nat. Hist.* **6**: 89. The wasp drawing its right antenna through the notch at the end of the tibia, beneath the apical spur. Pentax LX, 50 mm macro lens, 50 mm extension tubes plus 12 dioptre supplementary lens. Kodachrome 64.

3. A chironomid midge 'milking' aphid honeydew? N. A. Callow. 1993. *Br. J. Ent. Nat. Hist.* **6**: 88. The midge appears to be extending its front legs forward over the aphids. Pentax LX, 50 mm macro lens, 82 mm extension tubes plus 10 dioptre supplementary lens, Kodachrome 64.

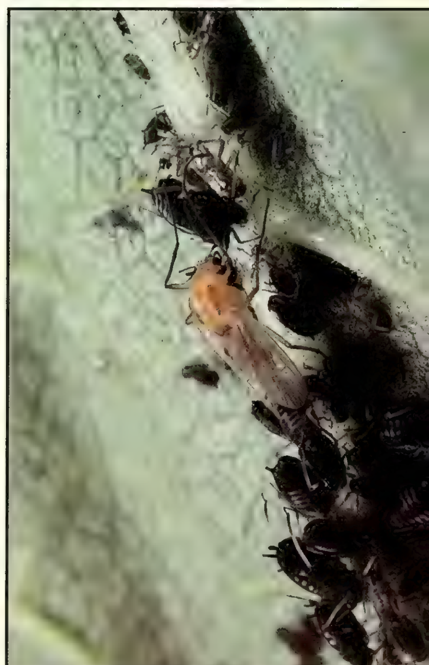
4. 'Cuckoo pupation' in the 6-spot burnet, *Zygaena filipendulae* (L.) ssp. *stephensi* Dupont. R. A Jones. 1993. *Br. J. Ent. Nat. Hist.* **6**: 89. Olympus OM1, Olympus 80 mm, f4 macro lens on Olympus 65–116 variable extension tube, two bracket-mounted flash guns, f22, Kodachrome 64. Burnet caterpillar inside the empty silk cocoon of the emperor moth (?). A burnet cocoon is just visible inside the emperor cocoon, on the right-hand side.

Plate IV

2

4

1



3

'Cuckoo pupation' in the 6-spot burnet, *Zygaena filipendulae* (L.) ssp. *stephensi* Dupont.—On 14.v.1992, the weather was warm and sunny, if slightly blustery on Gurnard's Head, near Zennor, Cornwall. Whilst photographing some burnet caterpillars, my attention was drawn to the empty cocoon of what appeared to be the emperor moth, *Pavonia pavonia* L., lying in the grass. The 'back end' of the cocoon was broken open, and although there was no sign of the chrysalis, inside was a burnet caterpillar, apparently about to pupate (Plate IV, Fig. 4). The empty papery cocoon of another burnet was already attached to the inside of the emperor's silk cocoon (just visible on the right of the photograph).

Why the burnet caterpillars had chosen such an unlikely spot to pupate is not known. Perhaps they were attracted by the texture of the emperor's silk, giving them an ideal substrate upon which to construct their own cocoons. Hiding their cocoons so may offer some protection from predation by birds. The two species of burnet that occur in Cornwall (W. G. Tremewan, pers. comm.), *Z. filipendulae* and *Z. trifolii* (Esper), normally spin their cocoons well up on the stems of grasses or other vegetation. Although the vegetation was moderately short, long grass stems were available to the caterpillars. Many species of burnet conceal their cocoons, and even *Z. filipendulae* does so in Turkey (W. G. Tremewan, pers. comm.).

My thanks to Mr W. G. Tremewan for his comments, and kind assistance to a non-lepidopterist.—Richard A. Jones, 13 Bellwood Road, Nunhead, London SE15 3DE.

Antennal cleaning behaviour of *Vespula germanica* (F.) (Hymenoptera: Vespidae).—While photographing wasps feeding on rotten pears on 15.x.1992, I obtained a shot of *Vespula germanica* cleaning its antennae (Plate IV, Fig. 2). It draws them through the gaps on the undersides of the lower ends of the tibiae, between the tibia and a short apical spur, which is just visible on the wasp's right front leg. These spurs also occur on the middle and hind tibae.—N. A. Callow, 25 Cranes Park Avenue, Surbiton, Surrey KT5 8BS.

***Peritrechus gracilicornis* Puton (Hemiptera Lygaeidae) recorded in error.**— The specimen of a lygaeid bug labelled '*Peritrechus gracilicornis* Puton, Great Deep, Southbourne, W. Sussex, 25.vii.91, swept', exhibited at the 1991 annual exhibition on 26th October 1991, (Hodge, 1992) has recently been examined by Stephen Judd, Entomology Department, Liverpool Museum and he has redetermined it as a female *P. nubilus* (Fallén).

Southwood and Leston (1959) state in couplet 5 on page 91 that the posterior tibiae are completely or almost completely black. Whilst this is true for many specimens of *P. nubilus*, this character is unreliable and the colour of the posterior tibiae is often as pale as in the closely related *P. gracilicornis*. A reliable external character is the relative size of the eyes which need to be accurately measured and compared with the width of the vertex: in *P. nubilus* the eyes are smaller, less than half the vertex width; in *P. gracilicornis* the larger eyes are as wide as or wider than half the vertex width. Both *P. nubilus* and *P. gracilicornis* can be separated from *P. geniculatus* (Hahn) by their distinctly more transverse pronota, as well as by the relatively thinner apical antennal segments. It should also be noted that *P. geniculatus* can also have the posterior tibiae pale-coloured.—Peter J. Hodge, 8 Harvard Road, Ringmer, Lewes, East Sussex BN8 5HJ.

References

Hodge, P. J. 1992. [Exhibit at 1991 BENHS Annual Exhibition.] *Br. J. Ent. Nat. Hist.* 5: 77.
Southwood, T. R. E. & Leston, D. 1959. *Land and water bugs of the British Isles*. London: Warne.

Apion intermedium **Eppelsheim (Coleoptera Apionidae) recorded in error from West Sussex.**—In the report for the 1983 annual exhibition (Hodge, 1984), *Apion intermedium* is stated to be 'new to East and West Sussex'. I have observed the weevil on two occasions in Sussex, both in Friston Forest, East Sussex (TV 5399); a single specimen swept on 12.vii.1981 and several examples on *Onobrychis viciifolia* Scop. on 23.vi.1983. As far as I am aware there are no records of the species from West Sussex.

Hyman and Parsons (1992) include West Sussex in the known distribution of *Apion intermedium*. It is assumed that this information was copied from the exhibition report cited above.—Peter J. Hodge, 8 Harvard Road, Ringmer, Lewes, East Sussex BN8 5HJ.

REFERENCES

Hodge, P. J. 1984. [Exhibit at 1983 BENHS Annual Exhibition.] *Proc. Trans. Br. Ent. Nat. Hist. Soc.* **17**: 16.

Hyman, P. S. (revised Parsons, M. S.) 1992. *A review of the scarce and threatened Coleoptera of Great Britain: Part 1*. UK Nature Conservation No. 3. Peterborough: JNCC.

BOOK NOTICES AND REVIEWS

Insect learning. Ecology and evolutionary perspectives, eds D. R. Papaj and A. C. Lewis, London, Chapman and Hall, 1992, xiv + 398 pages, £45, hardback.—The distinction between innate response and learned reaction is easy to pass over in insects, where many behaviours are not understood or poorly observed. Many of the actions which we observe in insects are not simply instinctive, but have to be learned. Host plant selection, poisonous plant avoidance, host selection by parasites and parasitoids, finding and choosing a mate, these are all learned to a greater or lesser degree. As the subtitle of the book suggests, it is the evolution of learning which is covered in the 14 chapters and this thorough review emphasizes that it is not just in the 'social' insects where learning takes place.

Insect chemical ecology: an evolutionary approach, eds B. D. Roitberg and M. B. Isman, London, Chapman and Hall, 1992, xii + 360 pages, £24.95, paperback.—Insect biochemistry has evolved through three main selection pressures: on chemical signals between insects (pheromones and message-bearing semiochemicals); through the interaction of insects and their host plants or host animals (detecting suitable hosts, appropriation of nutrients, dealing with deterrent toxicants); through the interaction of insects and their potential predators (manufacture of toxins and other defensive chemicals etc). The diverse subjects in this area are united by a constant theme—the evolution of biochemicals.

A colour atlas of medical entomology, N. R. H. Burgess and G. O. Cowan, London, Chapman and Hall, 1992, 144 pages, £55, hardback.—One of a series of 'colour atlases' covering various medical specialities and conditions, and unfortunately one that seems to have been rather thrown together to complete the publisher's list. Along with close-up photographs of insects (and other invertebrates) there are numerous gruesome pictures of those afflicted by stings, bites and subsequent infections. Surprisingly for a book which revolves around its illustration, all too many of the photographs are indifferent, out of focus or (especially the 'habitat' shots) unintelligible.

Flycatcher, Memoirs of an amateur entomologist, by K. A. Spencer. The Hague, Netherlands, SPB Academic Publishing, xvi + 414 pages with 27 illustrations, clothbound. Dutch Guilders 190.00, about £60.00.—This is a curiously interesting book, rather in the style of Osten-Sacken's *Record of my life work in entomology* (1903–04), and quite out of keeping with Dr Spencer's usual publications (approximately 160 of them, 132 taxonomic), being part autobiography, part commentary on notable entomologists, and part a sort of fill-in of detail and background associated with many of his agromyzid discoveries. But most of all, this is a do-it-yourself manual on how to become an expert, and in particular, a specialist. Throughout the whole book the reader is led, step by step, from the curious schoolboy to the keen amateur, then, by the chance association with Professor Hering, to the dedicated specialist and foremost authority on the Agromyzidae.

The book is divided into five parts. Each forms a separate and distinct facet to his life so far, but one can see how each forms a necessary prologue to the next stage.

Part one: "Life before flies" is a series of thumb-nail sketches of growing up, university where he read modern languages, and then army service. Anyone under 50 reading the book will find an intimate and personal account of the sombre years during which the general strike, the rise of Nazism and the Spanish civil war marked and moulded the youth of that age. This is not strictly autobiographical, but rather the world as seen through the eyes of KAS.

Part two: "Professor Erich Martin Hering" deals extensively with the man, perhaps the most influential in his life, whose book *Biology of the leaf miners* Spencer was asked to translate. It was during this period that Spencer found his true vocation, for by the time the book was published in English, he was fully committed to the study of the leaf mines of the dipterous family Agromyzidae.

Part three: "The printing industry, 1952–1970" combines a fascinating peep into the developing hi-tech of the industry during those post-war years, an impressive, almost meteoric rise from salesman to company director, and the conflict of work with an ever increasing dedication to entomology which in turn was bringing him a world-wide reputation as an important specialist.

Part four: "Collecting and studying Agromyzidae, 1951–1989", all 267 pages of it, forms the backbone of the book. A blow by blow account of his study of the world fauna presents rather daunting reading for the dilettante, but the entomologist will find a wealth of information on habitats and plants including the necessity of good note taking. But for all readers there are anecdotes (not enough in my opinion), experiences to make your hair stand on end, and a travelogue to beat any travel agent's brochure. For anyone contemplating a go-it-alone expedition to collect anywhere outside Britain, this part is essential reading. Here and there lists of mined plants collected or where seen, and species reared from the mines, make rather tedious reading. However, these records are deliberately included to supplement his many papers on the Agromyzidae and Chloropidae when it had not been practical to include the extra information, and form an important record for the future.

Part five: 'Miscellany" in some ways sums up his objects in writing the book. Starting with an article written during 1967, "The rôle of the amateur in entomology", Spencer contrasts the amateur and professional concluding that his status has always been that of an amateur. The next chapter discusses his and his wife Ann's life on their Cornish smallholding, its pleasures and penalties and their obvious enjoyment of the natural environment surrounding them. "Endpiece" forms a natural finish to the text with a resumé of the author's beliefs and a number of observations which would not have sat comfortably elsewhere.

Of the six appendices, five reproduce articles which although pertinent, are by way of explanations rather than continuations to the text; they are therefore appropriately collected here. The sixth is Spencer's method for preparing the male genitalia of the Agromyzidae, a technique which has been central to almost all his taxonomic work.

A bibliography of the author's works, a reference section and a very comprehensive index complete the book.

There is little to criticize in the content of this book, although I would take issue with his definition of a professional as a salaried employee. A professional in my understanding is one who is consulted for his specialist knowledge. Dr Spencer amply qualifies by that definition. It is unfortunate that demand for his services was not as frequent as for those in other fields—nor so well paid. However, his professionalism is well illustrated by his dedication and single-mindedness of purpose which is apparent on every page. For instance, Hering, his mentor, described 2186 insects of which 287 were Agromyzidae, but of those 105 (36.6%) are now synonymized. Spencer has described 1224 Agromyzidae of which only 85 (7%) are now synonyms.

The book is only available in hardback at present, illustrated with author's and other photographs. It is very expensive for the non-specialist content (14.5p per page). None the less, like Osten-Sacken's this is a book worthy of space on every bookshelf having something for everyone, be they tyro or expert. As a historical document on entomology since the Second World War it forms an important record, if not the only one so far. It is a book that one can just 'dip' into for the odd half-hour's enjoyment, or study for a purpose. In other words, it is a good read.

D. J. DE COURCY HENSHAW

Pollution monitoring with lichens by D. H. S. Richardson. Naturalists' Handbooks No. 19, Richmond Publishing, Slough, 1992, 76 pages, £7.95 paperback, £13 hardback.—Naturalists see lichens on almost all their expeditions but seem often to pass them by, perhaps anticipating difficulties with identification. This book may stimulate their interest, although it offers only a guide to identification problems, since its key includes only those species that are used as pollution indicators. Examples of all the genera concerned are illustrated in four attractive colour plates.

The value of lichens in pollution monitoring has become well known, especially since the publication in 1976 of *Lichens as pollution monitors* by Hawksworth & Rose, which is now out of print. As the author explains, lichens are especially good pollution indicators because of attributes such as their longevity, their dependence on atmospheric sources of nutrition and their high surface-to-volume ratio. He has included the findings of research carried out after the 1976 book was published, and which help to refine the ranking of lichen species for pollution-tolerance. About half the book comprises information on specific types of pollutant, including sulphur dioxide, nitrogen compounds, fluorides, aromatic hydrocarbons and radio-isotopes, as well as heavy metals whose uptake by lichens is of interest not only to pollution specialists but also to ore prospectors.

Although there is a strong emphasis on research, especially at the student project level, naturalists should find this book well worth reading, if only as an aid to understanding the indirect effects of pollution on animals—especially invertebrates—that depend on lichens for food or for camouflage. Anyone interested in further studies will find the extensive bibliography and lists of organizations very useful.

Like other books in the series, this is visually attractive and is a mine of information, thus perhaps justifying its rather high price relative to its size.

D. LONSDALE

Die Käfer Mitteleuropas, Band 13, Supplementband 2 mit Katalogteil, eds G. A. Lohse & W. H. Lucht, 376 pages, Krefeld, Goeke & Evers, 1992, DM 172 (approx. £73).—This is the thirteenth volume in the most important series of books for the British coleopterist. Following each previous volume in the series there has been a flurry of activity by British entomologists, applying the new keys and new nomenclature proposed by the Germans, and hopefully this activity will continue with the publication of this, the second supplement. The families supplemented are those appearing in volumes 6 to 8, the 'Malacodermata', 'Sternoxia', Dasciloidea, Dryopoidea, Dermestoidea, 'Clavicornia', 'Heteromera' and 'Lamellicornia'. The book is more than just a few amendments and additions, there are plenty of completely revised keys and descriptions, and as ever, the book is overflowing with diagrams and illustrations. Some of the more important revisions and updates cover *Dasytes*, *Ampedus*, *Elodes*, *Dryops*, *Elmis*, *Carpophilus*, *Meligethes*, Cryptophagidae, Latridiidae and *Aphodius*.

Habitat management for invertebrates: a practical handbook, Peter Kirby, Sandy, Bedfordshire, Royal Society for the Protection of Birds, 1992, 150 pages, £9, paperback.—Until now, the voices of those wanting to promote habitat conservation for invertebrates were in danger of being lost on the breeze. This book, however, provides an excellent source of ammunition when pressing for notice to be taken by landowners and land managers, be they farmers, local or national government, nature reserves, planning authorities or gardeners.

Peter Kirby's book crystallizes, in attractive and clear layout, the ways and means of countryside practice best suited to conserving invertebrate interest in a heavily cultivated and utilized landscape. It also points out some of the pitfalls and shortcomings in any habitat management. By example, it offers advice on grazing, mowing, dredging, clearing and coppice regimens, habitat structure and invertebrate associations. Together with the more 'obvious' areas like woodland, grassland, heathland and ponds, other less promoted habitats like river shingle, cliff seepages, bare ground and driftwood are emphasized.

No matter how informal a report of insects might be from any survey, it will always benefit from management or conservation proposals—for example, requesting a particular area be cleared of scrub, suggesting avoiding particular times for grass mowing, asking that fallen timber not be cleared away and so on. Reference to this book can only add weight to the convictions expressed in such a report. Photocopying the relevant chapter and attaching it to a report further increases the understanding and appreciation of the report's target audience. Even better would be an insistence that the whole book is bought and made prescribed reading for the management team! It is perhaps more for the benefit of a non-specialist land manager, that the book is so clearly and attractively laid out.

My only criticisms of the book are that it is a 'perfect' bound paperback, hence unlikely to survive well if it gets the use it deserves, and that the choice of a second colour for the text is too pale a blue to suffer clear photocopying. These are minor points, and must not detract from the fact that publication of this book will be greeted with enthusiasm by all entomologists, not least because of its publication and widespread dissemination by a 'non-invertebrate' conservation body—the Royal Society for the Protection of Birds (RSPB).

RICHARD A. JONES

OBITUARY

Edward Howard Wild, L.I. Biol. 1920–1992

Ted Wild, who died unexpectedly on 12th September 1992 at the age of 72 was well known to members of our Society and to moth hunters in general. His light-hearted contributions to the entomological journals including the recent "Mothmanship" series in the Record will be sadly missed as will his wit and fund of stories and anecdotes with which he entertained collecting companions.

Ted was born in Sheffield in 1920 but at the age of four moved to Croydon from where he spent many happy holidays on the Isle of Wight. Although he regarded himself as a Yorkshireman, especially where cricket was concerned, he retained a close affection for the island and its nature, retiring to Highcliffe in Dorset in 1981 from where he could see The Needles.

Ted attended Whitgift School and after college served in the army during the war years. While stationed in Somerset he was able to visit the Quantocks and spent much time collecting within the area.

He was demobbed in 1946 and entered the teaching profession, first at Lanfranc Secondary Modern School and then at Heath Clark Grammar School where he was head of the biology department until his retirement. He was not happy with the changing face of education which he regarded as an assault on standards and an affront to common sense and this contributed to his decision to retire early. That he could be an inspirational teacher is evidenced by the way in which a number of his pupils stayed in touch and have gone on to achieve much in the biological sciences.

In 1942 Ted married Marjorie Dyer, and they have two sons, Robin and Julian. Marjorie always supported Ted's collecting and especially in the early years of his retirement was a frequent companion in the field.

Ted collected keenly from early boyhood until 1952 when he became a student at the Institute for the Harmonious Development of Man and devoted his energies to

Fig. 1. E. H. Wild, 1920–1992.

the study of Gurdjieff's philosophy, immersing himself in the exacting regime the "work" entailed, to the exclusion of entomology.

At the end of the sixties he left this group and although he continued to follow the principles he had learned there to the end of his life, he had no more to do formally with that organization.

He resumed collecting and threw himself wholeheartedly into the entomological scene, involving himself in our Society's affairs and serving as Field Meetings Secretary and as Secretary from 1978 to 1980. An innovation he introduced was field trips for night collecting, which now of course have become the staple diet of our calendar.

After his return to collecting Ted pursued micros as well as the larger moths and quickly built up an impressive collection, especially of tortricids and a thorough knowledge of these groups. Unfortunately failing eyesight after his first heart attack in 1984 meant that his activities in this direction were curtailed in his last years.

Ted kept detailed diaries which run from the age of fourteen to the end of his life and record the circumstances of each insect he took. In addition, for many years he kept detailed trap records recording every insect in the garden trap and much use of these records has been made in compilation of local lists for the Croydon area and lately Hampshire. He was always keen to point out that although Highcliffe is in Dorset it is also in the Hampshire vice county 11.

During much of his life Ted lived in Selsdon and his garden trap produced a great variety of moths, many of them "good" species, including a most varied selection of *Agrotis clavis* Hufn. and a *Hyles euphorbiae* L. as well as an extraordinary run of *Xanthorhoe fluctuata* ab. *costovata*.

There are many notable insects in his collection amongst which can be mentioned the type of *Ennomos erosaria* D. & S. ab. *cornugrisea* Wild, two *Coenonympha pamphilus* L. ab. *albescens* and two *Plebejus argus* L. ab. *pulla* from the New Forest. In 1951 in a visit to Ham Street woods described in an article for the *Entomologist's Gazette*, Ted was fortunate enough to find the first specimen for 30 years of the scarce dagger, *Acronicta auricoma* D. & S.. He was tying his shoelace; the moth was just emerged and drying its wings. In the same year Ted found the first *Scopula nigropunctata* Hufn. taken at Ham Street.

When Ted retired to Highcliffe it was in the hope of getting migrants and he was well rewarded with amongst others *Diachrysia orichalcea* F., two *Chrysodeixis chalcites* Esp. and in 1985 a *Lymantria dispar* L. and *Lampides boeticus* L. which he caught in a tube while returning from having his hair cut. Shortly before his death several collectors visited him in search of *Udea fulvalis* Hübn. which had colonized his garden. In addition a *Pavonia pavonia* L. he took in the Quantocks and which was named by him ab. *flaviocellatus* Wild is in the R.C.K. collection.

Apart from butterflies and moths Ted was knowledgeable in many aspects of natural history and made an extensive collection of fossils from the Barton beds, Dorset and the Isle of Wight.

Ted did not by any means confine his interests to nature. Each day started with *The Times* crossword to be finished before breakfast! and he spent much of his retirement surrounded by books, devouring fiction from Tolkien to Kipling, or immersed in Egyptology, Eastern mysticism or the early history of the Church. He had superb concentration and could quote freely from what he had read, communicating his enthusiasm for certain books so that his friends' bookshelves grew to resemble Ted's. Painting was another hobby especially in his early years.

Ted contributed many notes and articles to the entomological journals of which those mentioned above are of special interest for their style as well as content. He wrote poems for himself, his family and friends, especially his granddaughter Rosie

and shortly before his death wrote a collection of short stories which combine entomology and mysticism, but which remains unpublished.

On a personal note I will miss Ted not only as a charming and enthusiastic collecting companion but as a teacher and confidant who could instantly see to the heart of matters with his third eye and make one consider afresh problems be they entomological, political or personal and see them from a different perspective. Our sympathy goes out to Marjorie and his sons.

A. J. Pickles

NEWS FROM DINTON PASTURES

With the completion of the Society's headquarters, the Pelham-Clinton Building, at Dinton Pastures in August 1992, the library and collections were installed during the Autumn. Members may now examine the collections and borrow books.

The rooms are usually open on the second and fourth Sundays of each month, but telephone 0734-321402 for a recording of exact opening times.

The 'official' opening is scheduled for Sunday 27 June 1993, with Professor Sir Richard Southwood F.R.S., performing the opening ceremony.

Wednesday 2 September 1992, the installation of the library at Dinton Pastures. Standing, from left to right: S. R. Miles (Librarian), P. J. Chandler (Curator), B. R. Baker, W. Parker, F. M. Murphy, R. W. J. Uffen. Seated: R. A. Jones. Photo: J. Muggleton.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on:

(a) leaf-miners
(b) Diptera, particularly Tephritidae and Agromyzidae
(c) Lepidoptera, particularly Microlepidoptera
(d) general entomology

in the above order of preference having regard to the suitability of applicants and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary to fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are unlikely to exceed £600 in 1993/94.

Applicants should send six copies, if possible, of a statement of their qualifications, of their plan of work, and of the precise objects and amount for which an award is sought, to Dr M. J. Scoble, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, as soon as possible and not later than 30 September 1993.

Applications are also invited from persons wishing to borrow the Wild M3 stereomicroscope and fibre optics illuminator bequeathed to the Fund by the late Edward Pelham-Clinton, 10th Duke of Newcastle. Loan of this equipment will be made for a period of up to six months in the first instance.

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BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Registered charity number: 213149

Meetings of the Society are held regularly in London, at the rooms of the Royal Entomological Society, 41 Queen's Gate, London SW7 and the well-known ANNUAL EXHIBITION and ANNUAL DINNER are planned for Saturday 30 October 1993 at Imperial College, London SW7. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary, R. F. McCormick, at the address given below.

The Society maintains a library, and collections at its headquarters in Dinton Pastures, which are open to members on the second and fourth Sundays of each month, telephone 0734-321402 for the latest meeting news.

Applications for membership to the Membership Secretary: A. Godfrey, 10 Moorlea Drive, Baildon, Shipley, West Yorkshire BD17 6QL.

Subscriptions and changes of address to the Assistant Treasurer: G. N. Burton, Mar-y-Mar, Minster Drive, Minster-on-Sea, Sheerness, Kent ME12 2NG.

Non-arrival of the Journal, faulty copies or other problems arising from distribution of the Journal or notices to the **Distribution Secretary:** D. Young, 32 Valley Road, Burghfield Common, Reading, Berkshire RG7 3NF.

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Cover illustration: queen wasps, Vespula species (Hymenoptera: Vespidae), hibernating under bark. Photo: R. A. Jones.

THE DEADWOOD FAUNA OF CORNWALL

KEITH N. A. ALEXANDER

22 Cecily Hill, Cirencester, Gloucestershire GL7 2EF.

Most entomologists who visit Cornwall tend to go there for its coastal specialities and all too often miss out on its inland habitats. The Lizard Peninsula and Sennen Cove are the 'classic' sites, not the ancient woodlands, pasture-woodlands and old parks. This is perhaps not too surprising, as the woodland specialities of the region, notably *Carabus intricatus* L. and *Anchonidium unguiculare* (Aubé), are also to be found in Devon, nearer to home for visiting English entomologists, unlike many of the coastal ones which are only to be found in the British Isles in Cornwall.

I have been making a special study of the deadwood fauna of the county over the past 15 years and, so far, 11 beetle species have been added to the county list, three flies, one aculeate wasp, and one false scorpion. The lack of recording of deadwood fauna in the county is well-illustrated by the fact that these additions include such widespread species as the beetles *Cerylon ferrugineum* Steph. and *Pediacus dermestoides* (F.).

While most sites visited appear to have only limited interest, a few are proving to be of considerable potential, notably Boconnoc Park and Ethy Woods, both within the Fowey River catchment. In fact, the lower section of the Fowey catchment is proving to be the most important area of Cornwall for deadwood fauna, although the valleys of the Tamar and Lynher are as yet little explored.

As elsewhere in the British Isles (Harding & Rose, 1986), the fauna is proving to be richest and most interesting in the areas which have had a long and unbroken history of mature and overmature trees—the old parks and other types of pasture-woodlands, rather than the enclosed woods with their history of intensive exploitation for wood products. Old coppices have proved to be not without interest, however, as the practice in Cornwall has been to bring on maiden trees in the valley bottoms as a supply of larger timber (see for example Rackham, 1987). These have maintained some deadwood species which would otherwise be missing from the coppices.

The field records have been checked with the extensive county fauna records collated by the Cornish Biological Records Unit. These contain records of a wide range of deadwood species, although a remarkably high proportion have not been reported since the list compiled by J. Clark for the Victoria County History (Page, 1906). A fuller list of the saproxylic beetles of Cornwall has been published elsewhere (Alexander, 1991).

NEW COUNTY RECORDS

The eleven beetle species recorded for the first time in Cornwall are as follows. *Quedius xanthopus* Er., Boconnoc Park (SX 144598), one beneath bark on fallen oak bough, 24.vi, and Stowe Woods (SS 225113), one beneath bark on collapsed old beech, 6.vii.1989. *Dirhagus pygmaeus* (F.), Ethy Woods (SX 133568), one swept along footpath, 7.vii.1983. *Melasis buprestoides* (L.), dead adults found in extensive borings in a dead oak coppice pole within Greystone Wood (SX 364788), 28.iii.1991. *Selatosomus bipustulatus* (L.), a dead adult of the variety without shoulder maculae, hanging in a spider's web on the trunk of a large old oak on the banks of the Fowey River below Respryn Bridge on the Lanhydrock Estate (SX 097632), 27.vi.1989. *Malthodes guttifer* Kiesenw., frequent, by sweeping, in Dizzard Oakwood (SX 160990), 13.vii.1989. *Thymalus limbatus* (F.), a freshly hatched adult still within the pupal

cell beneath bark on a fallen dead oak bough in Ethy Woods, 18.v.1990. *Rhizophagus nitidulus* (F.), the first record was by S. Grove, who found one in a dead birch, Camerance Wood (SW 839382), 8.vi.1989. I have subsequently found another, under moist bark on a fallen oak trunk in Greystone Wood, 29.iii.1992. *Pediacus dermestoides* (F.), this species is actually widespread in old oakwoods in the county. The first find was of larvae beneath moist bark on a recently fallen holm oak bough in Tremayne Woods (SW 729252), 17.iv.1984. Since then it has been found widely, both as adults and larvae, in both vice-counties, in ancient woodlands and pasture-woodlands, and in valleys draining northwards and southwards—although the latter systems have produced the majority of records. On one occasion, an adult was beaten from hawthorn blossom, Frenchman's Creek (SW 748258), 31.v.1989. *Triplax aenea* (Schaller), the first record was by S. Grove, who found one beneath bark on a large dead beech trunk in Ethy Woods, 27.vi.1989. *Cerylon ferrugineum* Steph., very widespread in old woods and parks in the county. I have encountered it on 27 occasions, from Greystone Wood across southern Cornwall to the Helford River, and in the north at Dunmere Wood (SX 050690), Trebartha Cascade Wood (SX 255772), Millook (SX 180990), and Peter's Wood, Boscastle (SX 113908). *Scolytus intricatus* (Ratz.), surprisingly scarce in the county. Recorded only once, in fallen oak boughs at Boconnoc Park, 20.v.1990.

The following Diptera breeding in dead and decaying timber have been added to the list. *Ctenophora pectinicornis* (L.), one taken by S. Grove at Pengwedhen, Helford Woods, 31.v.1989. *Dictenidia bimaculata* (L.), one taken by S. Grove in Boconnoc Park, 24.vi.1989. *Brachyopa insensilis* Collin, reported by S. Grove at Higher Hill Wood, Trencrom (SW 522362), v.1989.

The one aculeate added is *Passaloecus corniger* Shuckard, one at a standing dead beech trunk in Boconnoc Park, 24.vi.1989.

The false scorpion added is *Lamprochernes chyzeri* (Tomosvary), one under loose bark on an ancient beech, Boconnoc Park, 20.v.1990.

First records since Victoria county history

There are also a wide variety of species which have been recorded for the first time since the list published in the Victoria county history. These include the following beetles. *Abraeus globosus* (Hoffmann, J.), one beneath beech bark, Lanhydrock Park, 27.vi.1989. *Anisotoma humeralis* (F.), Landy Wood, Millook Valley, 25.vi.1989; and one by S. Grove in dead birch, Camerance Wood, 8.vi.1989. *Cerylon histeroides* (F.), one beneath moist bark on fallen oak, Greystone Wood, 29.iii.1992. *Rhizophagus ferrugineus* (Payk.), taken by S. Grove in Ethy Woods, 20.v.1990. *Biphyllus lunatus* (F.), in *Daldinia concentrica* (Bolt. ex Fr.) Cesati & de Notaris on old ash, Ethy Woods, 26.v.1990. *Mycetophagus atomarius* (F.), an elytron under loose bark on collapsed old beech, Stowe Woods, 6.vii.1989. *Melandrya caraboides* (L.), one dead in burrow in heartwood of old beech, Boconnoc Park, 24.vi.1989.

The following fly has also been recorded for the first time since the list. *Xylophagus ater* Meig., widespread in the eastern vice-county, but apparently absent from the west. Discovered in Millook Valley, 26.iii., and Ethy Woods, 27.iii.1985. Subsequently found at Lamorran Wood, Lanhydrock Great Wood, and North Hill Wood, Luxulyan Valley (SX 065564), in 1986; Pencalenick Wood (SW 8545) and Manely Wood, Lerryn Creek (SX 130567), in 1987; Stowe Woods and Trebartha Cascade Wood in 1989; Boconnoc Park in 1990; and Greystone Wood in 1992. All records are for larvae found beneath bark on broadleaved timber.

The following bug is also a recent rediscovery. *Xylocoris cursitans* (Fall.), under bark on beech stump, Boconnoc Park, 24.vi.1989; also under beech bark in Ethy Woods, 14.vii.1989; and Lanhydrock Park.

There are also further species, which were known in the county last century, but have not been reported since. These include the following beetles: *Paromalus flavicornis* (Herbst), *Ctesias serra* (F.)., *Litargus connexus* (Fourc.), *Mycetophagus piceus* (F.), and *Leiopus nebulosus* (L.), amongst many others. The named species are not particularly scarce further east, in southern England, but are clearly rare in Cornwall—if they still persist in the county at all.

Other important records

Three further species are also worthy of special note, the first two beetles, the third a woodlouse.

Mycetophagus quadriguttatus Müller, P. W. J., frequent in powdery fungus on inside of hollow stump of an ancient beech, Boconnoc Park, 24.vi.1989. This is a very rare species, with a relict old forest distribution plus a few records from dried stored products. There are only two previous Cornish records: from a flour mill at St Anthony, and from the Lynher Valley—the situation of the latter is not recorded.

Cryptolestes ferrugineus (Steph.), another species with dual habitats of relict old forest and dried stored products, although much more frequent than *M. quadriguttatus*. I have taken it from rotten beech in Lanhydrock Park, 27.vi.1989, and Boconnoc Park, 20.v.1990.

Haplophthalmus danicus Budde-Lund, frequent in a rotten ash trunk in Trelowarren Woods (SW 727238), 21.v.1989, and in a rotten log in Boconnoc Park, 24.vi.1989. Harding discovered it, new to the county, at Boconnoc Park, and comments that it is rare in the west of Britain (Harding & Sutton, 1985).

Western element

It is not surprising to find a strong western element in the Cornish deadwood fauna. The beetles *Dirhagus pygmaeus*, *Thymalus limbatus*, *Strangalia aurulenta* (F.), and particularly *Carabus intricatus* (which I have yet to encounter), and the fly *Xylophagus ater* are all characteristic of western Britain. They are not only associated with sites which have had a long and unbroken history of large old trees, but also with sites with a particular moist climate. This is especially true for *Carabus intricatus* and *Strangalia aurulenta*, while the other three extend far into northern Britain as well. Perhaps the most important feature of the British distribution of these three is their absence from the East Midlands and East Anglia.

Carabus intricatus is very much the local speciality. The Victoria county history lists it from 'under the bark of trees near Carthamartha' (part of the Inny Foot woodlands in the Tamar Valley) and 'two taken by the Rev. G. Lupton Allen at sugar, near Millook, in 1905'. The only other Cornish records known to me are by K. C. Side who is reported by Allen (1989) to have found it near Lostwithiel and near Bodmin in 1972. Side (1973) exhibited a specimen from Boconnoc Park—presumably the Lostwithiel locality referred to by Allen (1989). With the exception of one record from Somerset reported by Duff (1992), all other British records of this species have come from Devon.

The Fowey catchment sites

Boconnoc Park. This is a remarkable survival of a medieval deer park, still with ancient trees, hawthorns and rough pasture; it is well known as a nationally important site for relict old forest lichen communities. The highlights here are the beetles *Carabus intricatus*, *Strangalia aurulenta*, and *Mycetophagus quadriguttatus*. It is clearly an important site for saproxylic invertebrates, although perhaps only of regional significance. Privately owned, with no public access; SSSI.

Ethy Woods. The early history of this site is unclear, but the present structure suggests old pasture-woodland, although ungrazed for many years. It includes a good number of large old open-grown oaks, at present partly buried in a conifer plantation. The highlights are the beetles *Thymalus limbatus* and *Dirhagus pygmaeus*. Owned by the National Trust.

Lanhydrock Park Estate. Lanhydrock has a mixed history, being partly coincident with a 17th century deer park, now a landscape park owned by the National Trust. There is a good range of mature and overmature trees, but little hawthorn and the pasture has been heavily fertilized. Adjacent areas of the estate include ancient woodland as well as mixed plantations. The most interesting record to date is for the click beetle *Selatosomus bipustulatus*.

Other systems

Helford River Woodlands. Although far to the west, these woods are not without interest. Mostly old oak coppices, but with mature and overmature standards along valley bottoms. The highlights are the beetles *Xyloterus signatum* Fab. and *Strangalia aurulenta*. Some National Trust land, the rest private with limited public access.

Fal Estuary. The lower Fal is lined by old oak coppices extending from the estuary well inland. There are also a few parks, including the National Trust's Trelissick. The most interesting record so far is for the beetle *Rhizophagus nitidulus*. Limited public access.

Tamar Valley. The Tamar includes a number of wooded sections, but the most important block appears to be the complex around Inny Foot, just to the south of Launceston. Although extensively converted to conifer plantation, much of the complex is clearly ancient woodland, and large old oaks and ashes are still frequent along the narrow river flats. The northernmost wood, Greystone, has a character more akin to woods further east, rather than like Cornwall, and not surprisingly is the only Cornish locality for at least two species: the beetle *Melasis buprestoides* and the snail *Cochlodina laminata* Montagu. There is also an old record for *Carabus intricatus*.

Millook Valley. This north coast valley has an interesting mix of ancient woodlands, old pasture-woodland on former common land, and relatively unimproved fields. Old records for *Carabus intricatus*, *Prionus coriarius* L. and *Strangalia aurulenta*. Partly owned by the Woodland Trust, the rest private, but crossed by public paths.

Stowe Woods, Coombe Valley. Although extensively spoilt by conifer forestry, this wooded valley still contains sizeable areas of ancient broad-leaved woodland. The small inland block owned by the National Trust has proved particularly rich. Limited public access.

Valency Valley, Boscastle. This valley is well-wooded, including ancient woodlands such as Peter's Wood, extensive secondary woodland and possibly old pasture-woodland. Partly owned by the National Trust, and with good public access.

ACKNOWLEDGEMENTS

Special thanks are due to Stella Turk for access to the excellent records database maintained by the Cornish Biological Records Unit and to Captain Desmond Fortescue for permission to record invertebrates in Boconnoc Park. Francis Rose suggested a number of sites, Pat Sargeant of the Nature Conservancy Council (now English Nature) drew my attention to the Millook Valley, and Simon Grove helped with fieldwork in 1989. Some of the recording on National Trust land was carried out during the course of the Trust's Biological Survey programme.

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BOOK REVIEW AND NOTICES

Suffolk dragonflies by Howard Mendel. Suffolk Naturalists' Society, Ipswich, 1992, 160 pages, 72 colour plates, 34 maps, ISBN 0-9508154-5-4, hardbound, £12.00.— The exceptional standard in quality natural history publishing set by the Suffolk Naturalists' Society in 1986 by their production of *The butterflies of Suffolk: an atlas and history* has been more than equalled, with this latest book by Howard Mendel. The author's immense personal knowledge of both the Odonata and the county of Suffolk, coupled with his meticulous attention to detail and accuracy have combined to make this one of the most informative and enjoyable reads I have had for a long while. Here, in these conventionally-sized pages, is everything one could possibly want to know about Suffolk dragonflies, and a great deal about the insects in general that is equally applicable outside the county boundary.

Interestingly, the book opens (after the obligatory title pages and the Foreword by Norman Moore) with acknowledgements to those who have helped by communicating their records to the survey. As a recorder of various insect groups myself, I fully appreciate the author's reasoning in placing this section first and I commend him for it—even if my name does seem to have got lost somewhere! A British and Suffolk checklist follows and then a new innovation—a guide to the pronunciation of scientific names. This is often a problem area—I have never yet met two entomologists who completely agree on how different names should be pronounced—and Mendel is to be congratulated for this attempt to make scientific names more attractive to the less scientific reader. I feel confident that many very good field naturalists fail to publish their observations or are generally inhibited from adopting a more scientific approach to their field studies by the unfounded notion

that they could never manage/understand "Latin" names. Much of the confusion seems to stem from the lack of standardization (by us British) of the vowel sounds; my traditional English pronunciation of Lepidoptera names caused howls of laughter from my more enlightened eastern European colleagues who have managed to standardize the pronunciation of vowel sounds such as "ae", "i", "ii" and "e". I differ with Mendel in his suggested pronunciation of the Latin termination "*ae*" as "ee" (I was always taught to say "eye" in Latin classes) and the termination "*i*" as "eye" (I was told "ee"). It is all a fine point really, but in the absence of a set of rules I think the layman will have difficulty in applying the pronunciations to other groups of insects and especially to understanding verbal treatments of subfamily and tribal names. This may defeat the object of including the chapter in the first place!

That apart, the book continues with a series of excellent short, very readable chapters on life history and behaviour, Suffolk dragonfly habitats, a comparative history of Suffolk dragonflies 60 years ago, conservation, a history of dragonfly recording in Suffolk, some background on the Suffolk dragonfly survey, a few very useful words on how to record dragonflies (a subject usually taken for granted by most authors) and then the individual accounts of each species. The excellent, and very well researched text on each species is accompanied by a computer-generated tetrad distribution map produced using Dmap software. The species accounts which, let's face it, are what most people will want to read, provide me with all the data I need to be able to recognize the species, to know roughly where to look for it and to understand its distribution in Suffolk. I am pleased to see, in a book perhaps aimed at a wider readership than the specialist entomological circle, that Mendel cites references against statements included in the text, so enabling me to look up further information from the original source.

As more and more of our ponds and other wetlands vanish in the name of progress, particularly in the eastern part of England, this book will undoubtedly prove a valuable tool with which conservationists can arm themselves for the battle.

C. W. Plant

The practical entomologist by R. Imes, London, Aurum Press, 1992, 160 pages, £14.95, hardback.—A very general, but highly illustrated introduction to the study of insects—where to find them, how to record them, how to study their biology and behaviour.

Insects in flight by J. Brackenbury, London, Cassell, 1992, 192 pages, £18.99, hardback.—A splendid series of 'high-speed' photographs, freezing the insects, wings outstretched, in mid-air. Many different insect groups are included. The explanatory diagrams help convey the complex mechanics of insect flight, something lacking from previous 'mid-air' insect studies.

Crop pests in the UK edited by M. Gratwick, London, Chapman and Hall/MAFF/ADAS, 1992, xiv + 490 pages, £35, hardback.—The collected edition of 91 MAFF leaflets covering all manner of garden and crop pests, insects (63), mites (10), millipedes (1), symphylids (1), woodlice (1), nematodes (14) and molluscs (1). Each 'leaflet' covers one or more pest, arranged by taxonomic group or target crop plant, and is accompanied by photographs of adults, immature stages and damage. The text gives identification details, life histories, natural enemies, available means of control and other information.

NOMENCLATURE AND TAXONOMY OF A NEMATINE SAWFLY OCCURRING IN BRITAIN (HYMENOPTERA: TENTHREDINIDAE)

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Alteration to British list of Symphyta: **Pristiphora sermola** nom. nov., = *variipes* (Lindqvist) preoccupied, = *lanifica* Liston, misidentification. **Lygaeophora** subgen. nov. is described and the name *Lygaeotus* (subgenus of *Pristiphora*) made available by the designation of *Nematus coactulus* Ruthe as the type species.

INTRODUCTION

The Nematinae is most rich in species in northern and alpine parts of the northern hemisphere. In Europe, they form an important part of the plant-feeding insect fauna in the Alps (Benson, 1955) and in the northern countries (Zhelochovtsev, 1988). Their species richness declines in Central Europe, very few species being known in the Mediterranean region (Benson, 1968). Worldwide, many Nematines are attached to Salicaceae (particularly *Salix* itself) and Betulaceae as larval hosts. Perhaps in some way this strong association, and the species richness of willows themselves in boreal regions, has played a role in creating a large number of new niches for these sawflies fairly recently in geological time. Unfortunately for the taxonomist, the resulting burst of adaptive radiation in the group has caused great difficulty in the separation of species, and even some genera.

The superficial similarity of many adult forms which can usefully be defined as biological species, using larval characters and behavioural differences (e.g. foodplant association), has increasingly led to a reliance on greater or lesser genitalic differences for identification. Doubt can often be cast on putative colour characters and some small differences in external morphology because of known variability. Particularly in the extreme climate of parts of arctic Europe, including the Scottish mountain tops, this variability has been shown to be considerable in some species (Benson, 1962: p. 384). For these reasons I have concentrated mainly on genitalic characters in this article. The morphological terms used are those first proposed by Ross (1945).

Pristiphora is one of the largest European sawfly genera, with approximately 110 validly described species, 48 of which are known in the British Isles. Because of its size, there are numerous unresolved taxonomic and nomenclatural problems to be dealt with. Studies of type material are unfortunately certain to lead to many name changes. Viitasaari & Vikberg (1985) have already dealt with some of these. Their list is recommended for use by British sawfly students as a supplement to Fitton *et al.* (1978). Some further taxonomic problems in *Pristiphora* are clarified here.

IDENTITY OF BRITISH *PRISTIPHORA LANIFICA* AUCTT.

Liston (1981) introduced the name *Pristiphora lanifica* (Zaddach, in Brischke & Zaddach, 1882) to the British list. The first female British specimens were found ovipositing in the young leaves of *Salix caprea* L. in Edinburgh. Subsequently the larva was described (Liston, 1982) and a male specimen captured near Aberdeen (Liston, 1984). At the time of these captures I was greatly influenced by the paper of Hellén (1975) in which all of the species related to *lanifica* (Zadd.) were synonymized with that taxon. As Viitasaari & Vikberg (1985) have now pointed

out, much of the synonymy proposed by Hellén is inaccurate. In particularly, *P. lanifica* is not conspecific with *variipes* (Lindqvist, 1952) (see also Zhelochovtsev, 1988) Scottish specimens are in fact referable to the taxon described by *Lindqvist* as *variipes*.

Before discussing the British species further it is necessary to give it a new name: **Pristiphora sermola** nom. nov. for *Pristiphora variipes* (Lindqvist, 1952), preoccupied by *Pristiphora varipes* Le Peletier, 1823 (p. 61). The variant spellings of these species-group names (*variipes/varipes*) do not alter their status as homonyms: Article 58, International Code of Zoological Nomenclature (ICZN).

P. sermola (= *variipes* (Lqv.)) has a more obtuse tip to the paravalva of the penis-valve (Fig. 1) than *lanifica* (Fig. 2) and the valviceps of the former are altogether smaller. The female lancet has less pronounced serrulae in *sermola* (Fig. 3) than *lanifica* (Fig. 4). Further distinguishing characters are given by Lindqvist (1952). The larva of *lanifica* is attached to *Salix phylicifolia* L. (Kontuniemi, 1960: Zhelochovtsev, 1988), that of *sermola* feeds on *S. caprea*. Larvae of both species feed communally. They are members of a distinctive subgenus of *Pristiphora* containing approximately eight European species (Lindqvist, 1952).

LYGAEOPHORA SUBGEN. NOV.

Type species. *Lygaeonematus variipes* Lindqvist, 1952

Female. Sawsheath short, wide, subparallel-sided in dorsal view (Liston, 1981, Fig. 1) with dense brush of apical setae.

Male. Penis-valve with very short valvispina, and a short basal flap often developed below this. Dorsal surface of pseudoceps setose, tip elongated in a thin spur which is normally upcurved (Figs 1 and 2).

Larva. Free-feeding on leaf blade, communally or singly (Vikberg, 1966), on *Salix*.

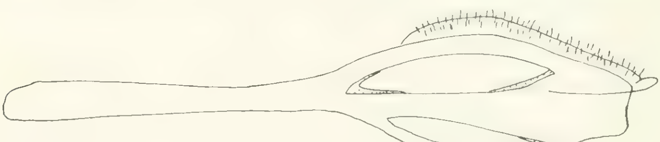

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Fig. 1. *Pristiphora sermola*, penis-valve.
Fig. 2. *P. lanifica*, penis-valve.
Fig. 3. *P. sermola*, basal serrulae of lancet.
Fig. 4. *P. lanifica*, basal serrulae of lancet.

Comments

The name *Lygaeophora* was first proposed as a subgenus by Lindqvist (1952), but is not available under this authorship following the ICZN because no type species was designated (Abe & Smith, 1991). Viitasaari & Vikberg (1985) used the name attributing authorship to Hellén (1975). However, Hellén did not make the name available: in fact he did not recognize any subgenera of *Pristiphora* or even the validity of the genera *Sharliphora* Wong or *Stauronematus* Benson. Separation of *Pristiphora* into subgenera is increasingly desirable as the number of known species rises. A similarly useful division is the subgenus *Lygaeotus* described by Lindqvist (1952) (= group C of *Pristiphora*: Benson, 1958). As for *Lygaeophora*, *Lygaeotus* requires the designation of a type species to make the name available: I hereby designate *Nematus coactulus* Ruthe, 1859 as the type species of *Lygaeotus*.

Zhelochovtsev (1988) included the *Lygaeophora* species in the genus *Micronematus* Konow, but I have little doubt that *Micronematus* (type species: *Nematus pullus* Förster, a junior synonym of *monogyniae* (Hartig)) should be reserved at the moment for *M. monogyniae* (Htg.). The distinctive biology of this species, a gall-maker in rolled leaf edges of *Prunus spinosa* L., and its different larval morphology justify this treatment as proposed by Lorenz & Kraus (1957).

Acknowledgements

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BOOK REVIEW

The butterflies and moths of Hampshire and the Isle of Wight: additions and corrections by B. Goater. U.K. Nature Conservation No. 7: Joint Nature Conservation Committee, Peterborough, 1992, ISBN 1-873701-26-8, vi + 266 pages, £10.70.—When the *Butterflies and moths of Hampshire and the Isle of Wight* was published in 1974 one reviewer stated that it would undoubtedly serve as the standard reference work for those counties. This has certainly been the case and workers in the Lepidoptera of Hampshire have constantly consulted it. After nearly 20 years however the need for an update was becoming pressing and perhaps few local lists have been more eagerly awaited. Mr Goater acknowledges these needs in his foreword in which he also dedicates the work to the memory of the late Denzil Ffennell.

The same format is used in the supplement as in the original, although nomenclature has been brought up to date and the species are numbered. The volume is presented in A4 format and although it may have been pleasing to have the two volumes shoulder to shoulder on one's bookshelves the reviewer finds the text particularly clear and easy to read. The descriptive presentation adopted by Mr Goater, rather than the numeric abbreviations used in some other lists, is clear and concise and the reviewer also appreciates records being attributed. As an example one entry under *M. aureatella* (Scop.) states "Woosons Hill, 7.v.88, sev. flying over *Vaccinium* in sunshine (JRL, DHS)" which seems to be an eminently useful and concise presentation of information.

Each species is referenced by page to the earlier volume where an entry appeared even when there are no additional records; however, including so much up-to-date information as it does, this supplement stands very well on its own without its predecessor.

One of the fascinating aspects of the records quoted here is the way in which the rise or decline of species becomes clear; as an example of which the entries for *Eulithis prunata* (L.) may be quoted. In 1974 Mr Goater concluded this was a very uncommon species which had probably decreased, although it was recorded from all three vice-counties usually as single specimens. In 1992 he is able to state that this species has certainly increased in Hampshire and the Isle of Wight since 1974, and to quote an impressive range of records in support of this contention. What changes will the next 15 years bring?

The only error that the reviewer has spotted is that the *Lampides boeticus* (L.) taken by the late E. H. Wild in Highcliffe did not come to actinic light but was secured in a tube during the day!

Following the systematic section the work is completed by an appendix listing additional localities and grid numbers under the three vice-counties covered and the indices of both the scientific and English names.

There is no doubt that this work is essential to anyone interested in the Lepidoptera of Hampshire and the Isle of Wight but because it records the changing status of many species over a limited period it will be of much wider interest and of particular use to those involved in conservation. The original volume in 1974 set a standard by which county lists are still measured and this work carries on that tradition, it is also very good value for money and is thoroughly recommended.

A. J. Pickles

NOTES ON EUROPEAN PHORIDAE (DIPTERA)

R. H. L. Disney

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Since publishing new keys to the British Phoridae (Disney, 1983, 1989a) I have been able to examine a greater range of material of poorly known species. In particular the use of my keys in the rest of Europe has prompted the re-evaluation of some species. The new data and conclusions are presented below.

Aenigmatias Meinert

This genus is still somewhat poorly known, especially the females. Gotô & Takeno (1983) give an amplified description of *A. dorni* (Enderlein) and revise Schmitz's (1955) interpretation of the female abdominal terminalia. The segment of which the posterior margin bears stout hooks is the 7th (not the 8th). The small pouch opening behind the posterior border of sternite 7 is engaged by the upper lobes of the postero-dorsal regions of the male epandrium during coupling. Schmitz erroneously thought this pouch was the gonopore. The form of tergite 7 is discussed below.

Of the six Palaearctic species the females of only two were known to Schmitz (1955). I have now procured the female of a third species, which is described below. The known females are keyed below, including the inferred positions in the key of the three species still only known as males.

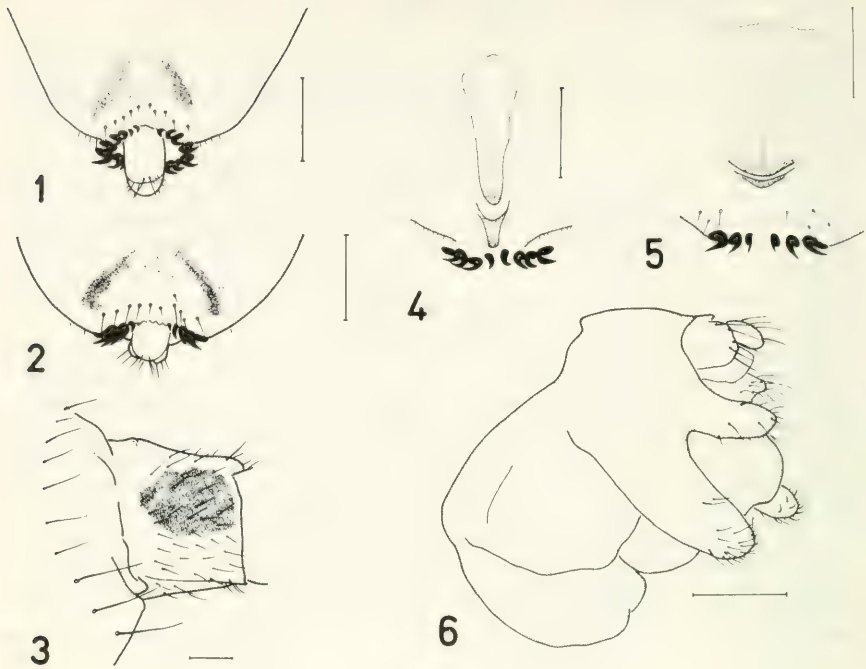
Key to females of Palaearctic *Aenigmatias*

1 Hind femur with basal half, or more, largely yellow 2
– Hind femur uniformly brown. Sternite 7 relatively broad and as Fig. 5. Tergite 7 as Fig. 2 .... *A. franzi* Schmitz
Note: *A. brevifrons* (Schmitz) and *A. picipes* Schmitz should also run to this point.
2 Abdominal tergite 5 distinctly pale, yellow to yellowish brown, in contrast to other tergites. Sternite 7 relatively broad and more or less parallel-sided (Fig. 5B in Gotô & Takeno, 1983). Tergite 7 with the darkened postero-lateral regions extending laterally and posteriorly so that a crescent-moon shape is formed by these two extensions (Fig. 211 in Schmitz, 1955) .... *A. dorni* (Enderlein)
—Abdominal tergites all dark (apart from paler postero-median part of 6). Sternite 7 relatively narrow and tapered (Fig. 4). Tergite 7 as Fig. 1 .... *A. lubbocki* (Verrall)
Note: *A. pyrenaicus* (Becker) should run to this couplet.

Aenigmatias franzi Schmitz, 1950

Peter Skidmore sent me a male and three females of this species collected in a Malaise trap by W. A. Taylor at Thorne Moors, near Doncaster, Yorkshire, 29 vi/14 vii, 1987. The female is described for the first time below. I also illustrate the male hypopygium in Fig. 6, for comparison with that of *A. dorni* (Fig. 4 in Gotô & Takeno, 1983) and *A. lubbocki* (Figs 16–17 in Disney, 1983).

Female. Head brown. Antennae brown with paler arista, which is very short-haired. Palps pale brown with three longer and 1–2 shorter apical bristles. Labella of proboscis small and pale dirty yellow.



Figs 1–3. Abdominal segment 7 of females: (1) *Aenigmatias lubbocki* from above; (2) *A. franzi* from above; (3) *Dohrniphora cornuta* from side. Scale bars = 0.1 mm.

Figs 4–6. *Aenigmatias.* (4)–(5) posterior-median region of ventral face of female abdominal segment 7: (4) *A. lubbocki*; (5) *A. franzi*; (6) *A. franzi* left face of male hypopygium. Scale bars = 0.1 mm.

Thorax and abdominal tergites coloured as head, except that the anterior margins of the abdominal tergites tend to be darkened. Venter greyish brown and devoid of hairs until rear of segment 6. The terminalia as Fig. 2 and sternite 7 as Fig. 5.

Legs with pale dirty yellow tarsi and brown pre-tarsi. Front tibia with a single, dorsal, hair palisade. Middle tibia with a dorsal, an antero-dorsal and an anterior palisade. Below the latter there is a second, irregular and incomplete, anterior palisade. Hind tibia with a postero-dorsal, dorsal and an upper anterior palisade running the length of the tibia. Below the upper anterior palisade are 2–3 irregular palisades. The upper one extends along the apical two-thirds and the lower 1–2 extend along the apical half or less.

The sclerotized patches of the female abdominal segment 7 are discussed below.

Conicera tibialis Schmitz, 1925

Conicera sobria Schmitz, 1936: **syn. nov.**

Schmitz (1953) distinguishes *Conicera sobria* from *C. tibialis* by the generally darker abdominal venter and palps in the latter. In addition he draws attention to a difference

in the length of the hairing of the arista and the hypopygial claspers of the male. I have examined 10 slide mounts of parts of the males of *C. sobria* from the Schmitz collection. It is clear that on every character cited by Schmitz this species lies well within the range of variation for *C. tibialis*. Furthermore Schmitz's statement that the underlying colour of the palps is pale is based on a slide-mounted head that has been cleared of all pigment, even the dense pigment of the eyes. In view of all this evidence I synonymize *C. sobria* with *C. tibialis*.

Megaselia Rondani

This enormous genus, with more than 1380 named species and most species still undescribed, is represented in the Palaearctic region by more than 400 described species. Many European species undoubtedly await description while many others await addition to the European list, being only known from elsewhere in our present state of knowledge.

The identification of specimens in such a large and difficult genus depends in the first instance, on identification keys. With these the number of possibilities can be reduced to manageable proportions. The available keys are cited in my keys to British species and Palaearctic catalogue (Disney, 1983, 1989a, 1991a). About 50 Palaearctic species are still omitted from all published keys. More recent additions have all been related to at least one published key.

Males of the following two European species are available to me, and have been run through the key to British species (Disney, 1989a). *Megaselia fuscoides* Schmitz will run to couplet 162, differing from *M. spinicincta* (Wood) by its dark brown legs, sparsely spinose labella and vein Sc reaching R1. *Megaselia perfusca* Schmitz will run to couplet 271, to *M. fusca* (Wood), or to couplet 293, to *M. spinolabella* Disney. The labella are too sparsely spinose for *M. fusca*, being only moderately spinose, as in *M. spinolabella*. It differs from the latter species by its more slender hind femur with longer hairs beneath (cf. Figs 9 and 10). Other species are discussed below.

Megaselia apophysata Schmitz, 1940

The holotype and six paratypes of this species are all female. They are very distinctive, in that ventrally the eighth abdominal segment bears a pair of long, hairy, processes extending rearwards (see Fig. 3, Taf. IV in Schmitz, 1940, or Fig. 10 in Disney, 1990a). In a footnote to his description Schmitz makes a brief reference to a male, caught at the same locality at the same time, which seemed to belong to the same species ('das mir bestimmt zur selben Art zu gehören scheint'). I have remounted this male on a slide and find it to be *M. clemonsi* Disney. This species was described from a series of males and a single female. The latter was caught visiting hawthorn flowers at the same place and the same time as the holotype male (Disney, 1984). It closely resembles the male. If this association of the sexes is correct then Schmitz's male is not *M. apophysata*.

While the single paratype female of *M. clemonsi* is still the only female recognized to date, the male has been found to be widespread in Great Britain and it is also recorded from Israel (Disney & Nussbaum, 1990). The female resembles the females of many related species and, in the absence of satisfactory keys to the females of the European *Megaselia*, is not likely to be recorded. The females of *M. apophysata*, however, are so distinctive that they are likely to be noticed. So far they are only known from the type series from Portugal. If the associated male did indeed belong to the same species (i.e. if the association of the male and female of *M. clemonsi*

is incorrect, and the males are a synonym of *M. apophysata*) then it is strange that no females have been caught in Britain, in view of the number of males procured to date. I conclude, therefore, that *M. clemonsi* remains a valid species, known in both sexes, and that Schmitz's male attributed to *M. apophysata* is really a misidentified specimen of *M. clemonsi*. The true male of *M. apophysata* awaits description (or recognition, if it is already described under another name).

Megaselia brevicostalis (Wood, 1910)

This species normally has two rectal papillae in the male and four in the female (Disney, 1989a). However, the species exhibits considerable variation in size and I have found that occasional smaller females only have two rectal papillae.

Megaselia coulsoni Disney, 1987

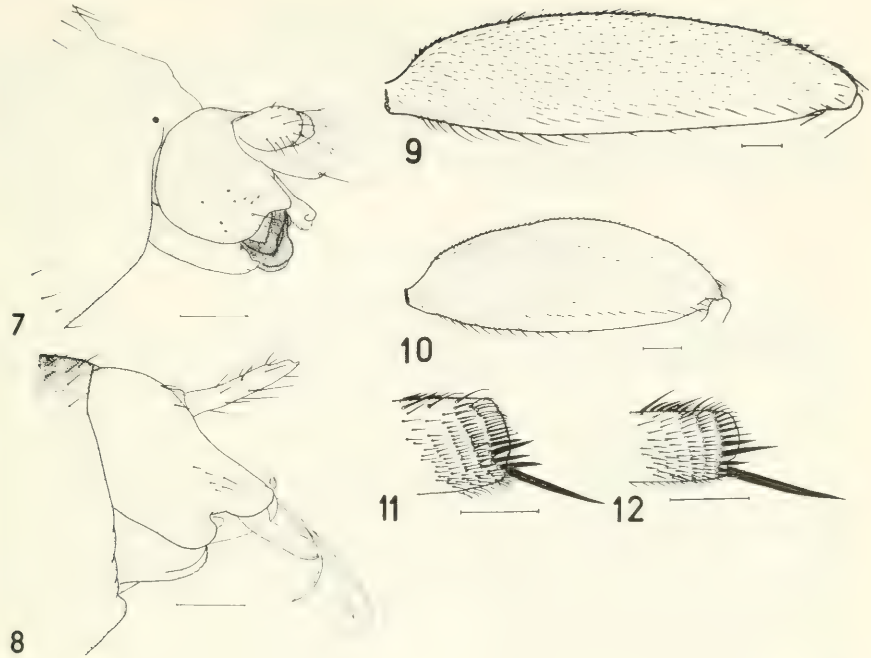
This species was described from a single male from England and was considered to have three bristles on the notopleuron. S.-O. Ulefors has sent me a second male from Sweden. In this specimen, however, there is a larger gap between the anterior pair of notopleural bristles and a third bristle behind. The latter bristle is evidently a pre-alar bristle. In my key (Disney, 1989a) specimens with only two notopleural bristles will run to couplet 212 instead of 241. The subequal posterior lobes of the hypandrium will immediately distinguish this species from the two species in couplet 212.

Megaselia diversa (Wood, 1909)

Megaselia sordescens Schmitz, 1927: **syn. nov.**
Megaselia pollex Schmitz, 1937: **syn. nov.**

The persistent misidentification of *M. producta* specimens as *M. sordescens* (see below) has had the effect of specimens of *M. sordescens* sensu Schmitz being assigned to *M. diversa*. In order to evaluate the supposed distinction between these two species I have remounted on slides, through the co-operation of Dr Brian Pitkin (of the Natural History Museum, London), part of the type series of *M. diversa*. I have designated a male, labelled 'Stoke Wd 6.8.08', as the lectotype. Its hypopygium is consistent with my figure for *M. diversa* (Fig. 292 in Disney, 1989a). Its hind-tibial comb is illustrated in Fig. 12. I have compared this lectotype with a male *M. sordescens* from the Schmitz collection labelled 'Fribourg 6.X.25 *sordescens*' and with slide-mounted legs and wings of the holotype and two paratypes. I conclude that *M. sordescens* is a synonym of *M. diversa*. The latter has proved to be a more variable species than Schmitz realized. This variation is continuous in terms of the supposed distinction in the hairs/bristles beneath the basal half of the male hind femur (Schmitz & Beyer, 1965).

I have examined the specimen of *Megaselia pollex* Schmitz from Glatzer Bergland referred to by Schmitz & Beyer (1965). It proves to be *M. diversa*. I have previously (Disney, 1985) noted that the only British specimen identified as *M. pollex* also proved to be *M. diversa*. I now conclude that *M. pollex* is merely specimens of *M. diversa* at the darker end of the range of variation for the latter species. *M. pollex* must be synonymized with *M. diversa*.



Figs 7, 8. Male hypopygia, left faces: (7) *Megaselia fennicola*; (8) *Puliciphora rufipes*. Scale bars = 0.1 mm.

Figs 9–12. *Megaselia* males, parts of hind legs: (9) *M. perfusca* anterior face of femur; (10) *M. spinolabella* anterior face of femur; (11) *M. producta* posterior face of tibia apex; (12) *M. diversa* posterior face of tibia apex. Scale bars = 0.1 mm.

Megaselia exarcuata Schmitz, 1927

This species was omitted from the keys of Schmitz & Bayer (1965) in error, but was noted in a postscript on page 519. It will key out either at couplet 7 of Abteilung IV, Erste Reihe or on page 522 of Zweite Reihe. It is clearly close to *M. gartensis* Disney, but the latter consistently has a dark haltere knob, while *M. exarcuata* has a yellow to dark yellow knob. No specimens of the latter have been collected in the British Isles. It is possible that *M. gartensis* is merely a subspecies of *M. exarcuata*, but until more evidence is forthcoming the two segregates are being treated as sibling species.

Megaselia fennicola (Beyer, 1958)

This species was described too late to be included in Schmitz's (1957) key to Abteilung II species. It is included in Colyer & Elberg's (1969) key to '*Plastophora*' species, which are now included in *Megaselia*. As this latter key is not readily available, I note that males will run to couplet 30 in the key to British species (Disney, 1989a) and I illustrate the male hypopygium in Fig. 7.

Megaselia longicostalis (Wood, 1912)

I have some males and females of this species from Spain with three rectal papillae. Normally the males have two and the females four (Disney, 1989a). Specimens with three papillae will further complicate the recognition of species in the *M. pulicaria* complex. Indeed this whole complex would benefit from the application of a modern technique, such as cytotaxonomy or investigations of structural enzymes or cuticular hydrocarbons.

Megaselia melanostola Schmitz, 1942

Plastophora balearica Colyer, 1969: **syn. nov.**

Megaselia balearica was described from a single female from Majorca. It was assigned to *Plastophora* Brues. This genus, however, has been synonymized with *Megaselia* (Disney, 1986). *M. melanostola* was described from a single male from Austria.

Dr Peter Bailey has sent me a series of four females and four males reared from a dead grasshopper, being attacked by a fungus, in December 1987 at Grandola, Portugal. The females agree with the description of *M. balearica*, except that the costal index is a little longer (at 0.45–0.46). Colyer (1969) gives this index as 0.42–0.43 (but from his figure it appears to be nearer 0.44–0.45, and Colyer's wing figures—being prepared from photographs—tend to be reliable). Also the first costal section is relatively longer (3.14–4.36 : 1, when compared with section three) in the specimens from Portugal. The ratio is only 2.6 in Colyer's specimen.

The males from Portugal run down to *M. melanostola*, but differ from the type and from British specimens in having a shorter costal index but a relatively longer costal section one. The hypopygia are indistinguishable (see Fig. 476 in Disney, 1989a). Furthermore a single female of *M. melanostola* has been collected along with males in Scotland (Disney, 1984). This female closely resembles the reared females from Portugal, apart from a longer costal index and relatively shorter costal section one. Its costal ratios, however, closely resemble those of Colyer's specimen from Majorca. The modified ovipositor segments are the same in all these females, and are the feature which caused Colyer to assign his specimen to *Plastophora*.

I conclude that *M. balearica* is a synonym of *M. melanostola*. However, I note that the costal index varies from 0.42 to 0.51 in females, and from 0.44 to 0.51 in males. The ratio of the costal section one to section three ranges from 2.60 to 4.36 in females and from 2.61 to 3.92 in males. The variation in the costal index suggests there may be a cline of increasing costal length with increasing latitude.

Megaselia posticata (Strobl, 1898)

In some males the anal tube proves to be uniformly dark. At couplet 116 of my key such specimens will run to 118 instead of 117.

Megaselia producta (Schmitz, 1921)

Megaselia sordescens auctt. nec Schmitz, 1927, misidentifications.

Sven -O. Ulefors (in. litt.) has carried out a critical review of the 'Kryophilen' group of the European *Megaselia* (see Schmitz & Beyer, 1965). He has exposed a significant cause of confusion. Beyer's Textfig. 319 (loc. cit. p. 552) purports to illustrate the male hypopygium of *M. producta*. However, his portrayal of the postero-dorsal region

of the epandrium is grossly inaccurate, and fails to indicate the extent of the marked inflation of this region (see Fig. 289 in Disney, 1989a). The result is that there has been a failure to recognize this species, the specimens being assigned to *M. sordescens* instead. The correct status of *M. sordescens* is considered above (under *M. diversa*). Fig. 11 illustrates the hind tibial comb of a male *M. producta*.

In my (1989a) Handbook couplet 65 lead 1 should conclude '. . . *producta* (Schmitz)', along with the caption for Fig. 289. *Megaselia producta* also needs to be added to the British list.

Megaselia pseudobrevior Disney, 1988

On the Canary Islands both sexes of this species were reported to have four rectal papillae (Disney, 1988c). However, I have some males from Spain with only two papillae. The females, and some males, from Spain have four.

Megaselia sinuata Schmitz, 1926

A male from Germany has the spines of the apical comb of the hind tibia bifurcated above the postero-ventral spur but simple below it. This variant has not been encountered before. It will still run to couplet 26 in my key. The hypopygium and vein Sc will distinguish it from *M. bifida* Disney.

Phora Latreille

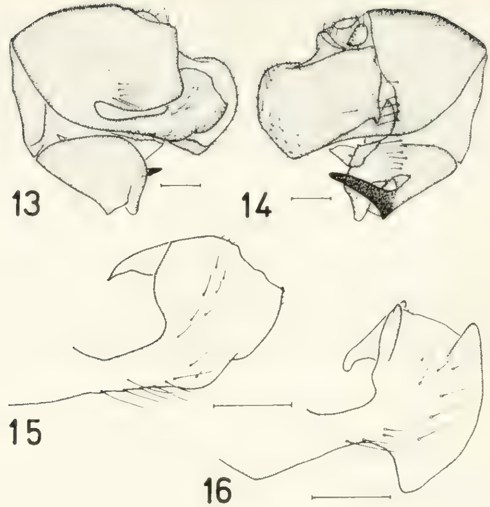
This difficult genus is still inadequately known for the Palaearctic region. Schmitz (1953, 1955) laid the foundations for later advances. The provision of an atlas of the male hypopygia of the British species (Disney, 1983, 1989a) has led to fewer misidentifications. The studies of Japanese species by Gotô (1984, 1985a–c, 1986) have clarified the recognition of several species, as well as adding new species. Further new species have been added by others (Zaitzev, 1977, Michailovskaya, 1986, Disney, 1989b).

A species poorly characterized by Schmitz (1955), and liable to confusion with the generally distributed *Phora atra* (Meigen), is dealt with below.

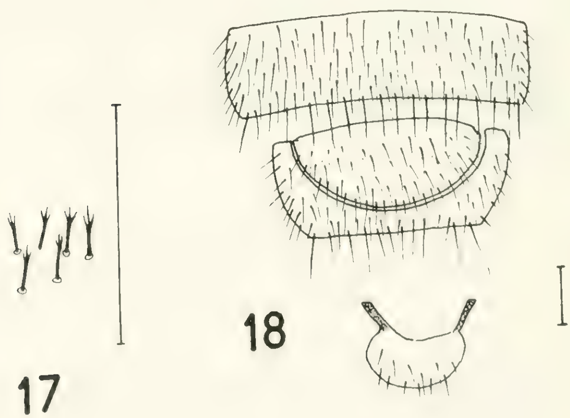
Phora limpida Schmitz, 1935

Schmitz (1955) distinguishes the male of this species from *P. atra* by the less concave hind margin of the upper lobe of the left side of the epandrium (cf. Fig. 13 with Fig. 108 in Disney, 1983). This is not reliable. The more reliable character is the difference in the form of the lower lobes of the left side (Figs 15 and 16).

Schmitz reported *P. limpida* from Italy, France and Spain. I have examined fresh material from Spain and also a male from Algeria (Akbou, Kabylie). *Phora atra* not only occurs in these countries but is widely distributed in Europe. It also occurs in the Nearctic region. I have remounted on a slide a male from a series collected in Spain by C. N. Colyer, and now in the Natural History Museum (London). Colyer attributed these to *P. limpida*. The remounted specimen, collected 14.vi.1966 at Gran Meda, has proved to be *P. atra*.



Figs 13–16. *Phora* males, hypopygia: (13–15) *P. limpida*, left face (13), right face (14) and lower lobe of left face of epandrium (15); (16) *P. atra* lower lobe of left side of epandrium. Scale bars = 0.1 mm.



Figs 17–18. *Puliciphora rufipes* female: (17) frontal hairs adjacent to ocellar triangle; (18) abdominal tergites 4–6. Scale bars = 0.1 mm.

Puliciphora Dahl

The Old World species of this genus are keyed by Disney (1988a, 1990b). A species previously only known from the Neotropical region and South Africa is now reported from France.

Puliciphora rufipes Silva Figueroa, 1916

In 1990 Alain Thomas sent me a female of this species from the Adour Valley, near Tarbes on the French side of the Pyrenees. Dr Loic Matile asked me to examine another female from the French Pyrenees collected (by J. P. Besson) from the Grotte de Sespran, Izeste, on 14.xii.1991.

The species is very similar to *P. borinquenensis* Wheeler, as mentioned in my key to British Phoridae (Disney, 1983). The female is most readily distinguished by the trifid-tipped hairs adjacent to the ocelli (Fig. 17). The male hypopygium is shown in Fig. 8.

Discussion

Brown (1992) is proposing the transfer of *Diplonevra* Lioy and *Dohrniphora* Dahl from the Phorinae to the Aenigmatiinae, on the basis of three postulated synapomorphies discussed below.

Brown's principal postulated neomorph is the development of dorso-lateral sclerites on the female abdominal segment 7. This is illustrated for *Dohrniphora cornuta* (Bigot) (Fig. 3) for comparison with the condition in *Aenigmatias* (Figs 1, 2). I suggest that a more parsimonious interpretation of this feature is that in both genera there has been a reduction and loss of the median third (or more) of tergite 7. In the case of *Aenigmatias* this has been associated with an enhancement and extension of the postero-lateral regions of the tergite, in association with the development of the series of strong hooks at the rear of each side of the segment (Figs 1, 2). In the case of *Dohrniphora* the lateral expansions of tergite 7, while the median band is lost, is associated with the development of a so-called 'sensory complex' of heavily sclerotized spinules at the base of the male hind femur (e.g. Disney, 1983, 1990c). It is now known that in *D. cornuta* these spinules are used to grip and compress the female segment 7 during copulation (Barnes, 1990). I suggest, therefore, that in the case of *Dohrniphora* the modifications of the female's tergite 7 are adaptations allowing both the protection for, and ease of compressibility of, segment 7 during mating.

Aenigmatias males possess no 'sensory complex' at the base of the hind femur. The reduction of the sclerotization of the median band of tergite 7 in females is probably related to the need for compressibility of the segment in relation to the use of the two sets of sclerotized hooks. The probability is high, therefore, that the loss of sclerotization of the median band of tergite 7 in *Dohrniphora* females evolved independently of the reduction of sclerotization of the same region in *Aenigmatias* females. This inference receives support from the observation that in the aenigmatiine genera *Aenigmatpoeus* Schmitz and *Psyllomyia* Loew the female terminalia are less modified than in *Aenigmatias*. However, segment 7 not only lacks the two series of sclerotized hooks but tergite 7 is absent altogether in these two genera. Furthermore in *Aenigmatias* the expansion of the lateral portions of the tergite are essentially postero-laterally. By contrast the expansions in *Dohrniphora* are laterally only, along the entire length of the tergite. It is possible, therefore, that the sclerotized patches in *Aenigmatias* are a neomorph evolved after an initial loss of tergite 7. Their markedly

postero-lateral position, in relation to the original position of tergite 7, would favour such an interpretation. In view of the evidence of much convergent and parallel evolution in the Phoridae (e.g. Disney, 1991b), Brown's hypothesis cannot be regarded as being well-founded.

Another of Brown's postulated synapomorphies, linking *Aenigmatias* to *Diplonevra* and *Dohrniphora*, is the approximation of veins R2 + 3 and R4 + 5, so that they are subparallel. This is a transformation of degree only, and one with a high probability of occurring independently several times. This is underlined by the clear evidence of an even more striking independent evolution of the approximation of veins R1 and Rs in different clades of Phoridae (Disney, 1991b).

Brown's third proposed synapomorphy linking these genera is the acquisition of longitudinal hair palisades on the mid and hind tibiae. This is a reversal of the polarity of a transformation sequence proposed by myself (Disney, 1988b). I stand by my proposal until convincing evidence is presented to refute it. I am, however, currently attempting to test my hypothesis.

For the present at least, I propose to reject Brown's transfer of *Diplonevra* and *Dohrniphora* to the Aenigmatiinae. Classifications should only be altered when controversies have been resolved.

Acknowledgements

I am grateful to Dr H. Ulrich (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany) for the loan of specimens from the Schmitz Collection and Dr B. Pitkin (the Natural History Museum, London) for the loan of specimens in his care.

My work on Phoridae is now being supported by grants from the Isaac Newton Trust (Trinity College, Cambridge) and the Harold Hyam Wingate Foundation (London).

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BOOK REVIEW

Lepidoptera of North East Essex by B. Goodey and J. Firmin. Published by Colchester Natural History Society as a special issue of *Nature in North East Essex* and available at £4.95 from J. P. Bowdrey, Museum Resource Centre, 14 Ryegate Road, Colchester COI IYG.—The contents of this local list comprise a map of the area covered, a foreword by Col. A. M. Emmet, an introduction explaining the circumstances leading to the compilation of the work, a number of essays on different aspects of the Lepidoptera of the area and a systematic section with introduction and references. There are also a number of pleasing drawings of notable North Essex species which although not particularly useful as identification aids certainly enhance the visual presentation.

Amongst the aspects of the area covered which I found of particular interest were the historical notes written by J. Firmin and covering a number of lepidopterists of the area including the eminent John Ray, Miss Laetitia Jermyn who published *The butterfly collector's vade mecum* in 1827 and Gervase Frederick Mathew after whom *Mythimna favicolor* (Barr) was given its English name—Mathew's wainscot. All of the essays are interesting, but my favourites are the story of Mr Dewick's light trap with fascinating drawings of this legendary machine, which at 28 feet long and 12 feet wide is believed to be the biggest in the country, and Mr Fisher's account of his discovery of *Gortyna borelli* (Piere) with refreshing personal detail such as Mr Chalmers-Hunt saying as he dug out a larva ''Mr Fisher, history is being made at this moment''.

It is pointed out in the introduction that this work has built on the many additional records which have followed comparatively recent publication of *The larger moths and butterflies of Essex* and the *Smaller moths of Essex*. The systematic list incorporates these additional records and species are recorded under 10-kilometre squares with an indication of residency, range and frequency. This list concentrates on more recent records and gives additional information on more interesting or poorly recorded species.

It took me a little time to get to grips with the abbreviations used in the systematic section, but eventually I concluded that little was sacrificed in clarity for the sake of being concise.

This book, although of primary interest to Essex naturalists has a lot to offer and will find its way onto the shelves of many from outside the area I am sure, provided they can accommodate its A4 format.

A. J. Pickles

OFFICERS' REPORTS FOR 1992

COUNCIL'S REPORT

The Society's membership stood at 700 at the end of the year, a small decrease on the numbers for the previous year. Eighteen new members were elected during the year, 24 were struck off for non-payment and ten members resigned. Eight deaths were reported to the Society during 1992.

The Council met eight times during 1992 and, on average, 14 members attended each meeting. A lot of the Council's time was taken up discussing the Society's new accommodation at Dinton Pastures, which has now been named 'The Pelham-Clinton Building' in honour of the donation bequeathed to the Society by this well-known member; this donation made the construction of The Pelham-Clinton Building possible. This venture has all but been paid for and the occupation, as you all must know, has taken place but this has not been without problems; many visits have been made to the premises to rectify faults in air-conditioning and alarm systems. The Council's thanks go to our hard-working Curator Mr Peter Chandler who has devoted a great deal of his spare time to sort these problems out.

The Pelham-Clinton Building has been opened to the membership on average every two weeks from the 1st of November 1992 and a further list of opening times is on the back of the AGM notice; providing the membership continue to come with the enthusiasm shown so far (around 12 each time), then the Council will try and keep the frequency of openings at the same level. We must however, not lose sight of the fact that to open this facility, hard-working members of the Council are giving up their free time.

The Society continued to represent members' interests in the field of conservation and Mrs F. M. Murphy and Mr S. R. Miles take an active part as the Society's representatives on the Joint Committee for Conservation of British Invertebrates. The Society continues to subscribe to Wildlife Link, and is still consulted by the Joint Nature Conservation Committee on the addition of any species to Schedule 5 of the Wildlife and Countryside Act.

There were eleven indoor meetings held at the Royal Entomological Society rooms during 1992 including a joint meeting with the London Natural History Society. In general, attendance at indoor meetings was, for the first half of the year, poor but numbers picked up from then on because of Dr McLean's efforts in advertising these meetings. The increase in members coming to the indoor meetings makes it worthwhile keeping this level of meetings going when the cost of this room each time and speakers' travel expenses is taken into account. Methods of keeping the momentum going are being discussed and a full programme of indoor meetings and opening days at The Pelham-Clinton Building is being arranged for 1993/94.

Seventeen field meetings were held at wide-ranging areas of the countryside; attendance at these was low and Mr Roger Morris would like more members to come to these meetings as, more often than not, a great deal of effort has been made to get permission to get onto some sites, especially as the leaders of these meetings have made the effort to volunteer in the first place.

A successful Annual Exhibition was organized by Mr Michael Simmons and was attended by 183 members and 64 visitors, a decline on the previous year's attendance. There were around 170 exhibits with the usual slant on the Lepidoptera. Dr Basil MacNulty again organized the Annual Dinner with his customary skill, but only 34 members and companions stayed to this event; a look at possible alternatives to the Annual Dinner is going to be discussed at this year's Council meetings with, probably, a questionnaire being sent to all of the membership to get their views.

Treasurer's Report

Over the last year the finances of the Society have been dominated by the need to fund the building programme at Dinton Pastures.

In the uncertain market conditions we have not sought to encash any of our stock exchange investments but have withdrawn funds from bank deposits.

The cost of building and equipping the Pelham-Clinton Building has risen to £144 431 all of which has been capitalized, and we still anticipate a final net payment of retention monies which will be very small. It is intended that this cost will be amortized over the term of the lease with the first charge being in the financial year to 31st December 1993. The asset is represented by the housing fund which is made up of the original balance of £2308 unchanged for many years, grants received of £10 000 from the Esmee Fairbairn Charitable Trust and £2000 from the William A. Cadbury Charitable Trust, both obtained through the good offices of our Vice President, Andrew Halstead; and the balance of £130 123 transferred from the bequest fund. The bequest fund represents the good will of many past benefactors but in particular the generosity of Teddie Pelham-Clinton, Mr Crow and Mr Hammond.

During this last year the bequest fund has received legacies of £250 from the late Ted Wild and £100 from the estate of J. A. C. Greenwood and stands in excess of £135 000 after the payments for Dinton Pastures.

Turning to the income and expenditure account, it is to be noted that interest and dividend income has fallen sharply and this of course reflects both reduced interest rates and falling capital held on deposit.

Overall costs of running the Society and providing the Journal to members has risen from £11 700 last year to £13 419, but this includes nearly £1400 of removal expenses which should not be repeated for 70 years.

Our estimates show that it will cost £14 000 to run the Society in 1993 with approximately £8000 coming from subscriptions and £6000 from investment income.

During the year your Council has taken the decision to end the system whereby members living in the London area have paid more than 'country' members. It has long been felt by some of us that this was an anomalous situation in a Society calling itself the 'British', and is of course a leftover from the days when we were the 'South London'. With the move of our headquarters out of London the system became untenable and after taking a sounding from members which was favourable to the change, steps are in hand to put the single rate into practice.

Lastly I would like to turn to auditors and the Charities Act. For many years we have relied on auditors from within the Society who have examined our annual accounts on a voluntary basis. At the moment Col. Sterling and Mr Bell perform this task for us. The Charities Act which comes into force later this year specifies that in certain circumstances only qualified auditors who are registered as such under the Companies Act are able to perform this function. We believe we will fall into this category and therefore will be forced to look outside the Society and probably pay for this service. There will therefore be a motion later this evening to reappoint our present auditors but to appoint auditors under the Companies Act as may be necessary later in the year. I would like to express Council's thanks to Col. Sterling and Reg Bell for carrying out our audit once again.

A. J. Pickles

Balance sheet as at 31st December 1992

1991 £				1992 £	
		Capital employed			
33671		*General fund*	—Opening balance	37977	
4305	37976	—Transfer from income and expenditure account		1610	39587
2308		*Housing fund*		2308	
—	2308	—Contributions from other funds		142123	144431
25727		*Special*	—Opening balance	26884	
1157	26884	*publications fund*	—Surplus from sales	1631	28515
218025		*Bequest fund*	—Opening balance	250217	
460			—Gain on redemption	—	
5000			—Bretherton bequest	—	
27330			—Income	17357	
(598)	250217		—Grants & expenditure	(131163)	136411
4546		*Hering memorial*	—Opening balance	4999	
653		*fund*	—Income	659	
(200)	4999		—Expenditure	(780)	4878
	322384		*Total funds*		353822
		Employment of capital			
		Cost of leasehold			
	5964	Premises			144431
		Quoted investments			
	32077	General fund			32077
	3540	Hering fund			3540
		Current assets			
5074		Special publications		4000	
186		Christmas cards		300	
3737		Sundry debtors and payments in advance		1211	
57631		National Savings investment account		63130	
195000		Sterling money market deposit		80000	
17816		Business reserve deposit		17693	
4738		Bank current account		9825	
284182				176159	
		Current liabilities			
3379		Sundry creditors and accrued expenses		2385	
(3379)				(2385)	
		Net current assets			
	280803				173774
	322384				353822

Income and expenditure account for 1992

1991 £				1992 £
		General account		
	8135	Subscriptions		7907
	32282	Interest and dividends		24545
	8499	Donations and bequests		12507
	56	Surplus on Christmas cards		79
	15	Surplus on dinners		7
—		Headquarters services	486	
3767		Rent and insurance	2344	
—		Headquarters maintenance	677	
1580		Stationery and general expenses	2009	
71		Bank charges	96	
799		Indoor meetings and exhibitions	1759	
280		Library	136	
23		Curation costs	—	
168		Subscriptions and donations to other societies	208	
—		Moving expenses	1379	
	6688			9094
	(42299)			(35951)
		Publications account (free to members)		
(1150)		Sales	(1339)	
(598)		Bequest fund grant for plates	(1039)	
5872		Production of journal	5493	
888		Distribution costs	1210	
	5012	Net cost of publications		4325
		Special publications (for sale)		
(2595)		Sales	(3153)	
6192		Opening stock	5074	
320		Distribution and general costs	448	
(5074)		Closing stock	(4000)	
	(1157)	Net surplus on special publications		(1631)
	(38444)			(33257)
653		Surplus to Hering fund	659	
32329		Surplus to bequest fund	17357	
4305		Surplus to general fund	1610	
1157		Surplus to special publications fund	1631	
—		Transfer to housing fund	12000	
	38444			33257

Notes to the Accounts
Year to 31 December 1992

Accounting policies

(a) The Accounts are prepared under the historical cost convention.
(b) The costs of building and equipping leasehold premises at Dinton Pastures Park have been capitalized. The total cost of these premises which are anticipated to be completed during the year to 31 December 1993 will be amortized over the term of the lease. The first amortization charge will be made in 1993.
(c) The value of the library, collections, ties, back numbers of Proceedings and Journals and the computer system is not included in these accounts. Current expenditure on such items is written off to the income and expenditure account.
(d) Donations and legacies are brought into account when they are received by the Society.
(e) Surplusses (or deficits) arising on the special publications fund which account for publications primarily for sale are transferred to that fund to finance future publications.

Investments

			Book value at cost		Market value
			General & bequest	Hering memorial	
1230	Shell T&T 25p Ord.		477.79	771.83	6334
750	Unilever 5p Ord.		248.45		8152
6272	M&G Charifund Units		19091.17	1147.24	35455
£2450.90	Treas. 9½%	1999	771.22	1621.21	2665
£3863.71	Treas. 8¾%	1997	3687.94		4087
£3882.90	Treas. 9%	1994	3759.57		4038
£4098.06	Treas. 13¾%	1993	4041.44		4339
			32077.58	3540.28	65070

Fund movements

The housing fund representing the cost of the Dinton Pastures building has been augmented by the transfer of the two grants totalling £12000 directly from the income and expenditure account and the transfer of the balance from the bequest fund. A grant has also been made from the bequest fund towards the cost of colour plates shown in the publications account.

Report of the auditors to the members

We have examined the financial statements attached which have been prepared in accordance with the recommendations of SORP2.

We have audited the financial statements annexed in accordance with approved auditing standards.

In our opinion the financial statements which have been prepared under the historical cost convention give a true and fair view of the state of the Society's affairs at 31 December 1992 and of its income and expenditure for the year then ended.

COL. D. H. STERLING
R. A. BELL

Professor Hering Memorial Research Fund

Five grant applications were received in 1992 for awards for 1993, a number partly due to the secretary having had the opportunity to advertise the fund at the European Lepidopterists' Congress in Helsinki last April and at the International Congress of Entomology in Beijing last June.

The Committee agreed to make awards to four of the applicants. A sum of £200 was granted to each of the following applicants: Mr David Agassiz, Imperial College at Silwood Park, Ascot, UK, for his study of the spread of the leaf-mining gracillariid moth *Phyllonorycter leucographella*; Dr Vincas Buda, Institute of Ecology, Vilnius, Lithuania, for his work on intraspecific competition in *Phyllonorycter nigrescentella*; Dr Rimantas Puplesis and colleagues, Zoological Institute, Vilnius, for their survey of leaf-mining Lepidoptera in Central Asia; and Dr Yuan Decheng, for his study of Chinese Gracillariidae, Academica Sinica, Beijing, China.

The microscope bequeathed to the fund by the late Edward Pelham-Clinton, 10th Duke of Newcastle, continues to be lent to Dr Margaret Redfern, there having been no further applications to borrow this instrument.

M. J. Scoble

Librarian's Report

Now that our plans for the provision of the new facilities at Dinton Pastures have come to fruition I believe that the project can be described as a success. However this was not without considerable anxieties particularly as to the co-ordination of the supply and installation of all the library fittings and other furniture promptly after the completion of the building. There was also the concern for the books coming back from store, would they be damp from poor storage? Fortunately they were not. How many had actually been stolen? It was later confirmed that the nine reported as having been offered to a bookseller, in my 1990 annual report were indeed missing. However, it was decided to write them off.

To monitor the construction progress I attended most of the monthly site meetings held between the Society's architect, the builders and ourselves. This enabled me for instance, to monitor the installation of the electrical layout and to propose minor alterations within the library area. The library shelving supplier, Balmforth Engineering Limited of Luton, was unable to store completed shelving on its site for very long. Therefore it was necessary for me to be able to closely schedule the ordering of the library shelving with the progress of the construction and the eventual building completion dates. As a large number of shelving colour and fabrication permutations were possible with Balmforth's systems, considerable time was spent in refining our order with them. When these units were finally installed in September, only one small problem arose, which was due to an oversight on my part. This was that in trying to maximize shelving space in my layout I had not left enough room at the top of the units for the stabilizer bars to be fitted, however the company quickly overcame this a few days later. I also had to consider the combined weight of the shelves and books, thus at an early stage I decided to employ steel foot spreader plates to limit indentation into the floor tiles, these plates were obtained by special order via the builders of the new premises.

The task of placing the Society's books on a database was also continued throughout this period, using the old library card index as a basis for this purpose. This project was mainly to enable an inventory stocktake to be undertaken when the books were withdrawn from Pickford's depository. This task was largely completed in just over

one week with considerable help from many volunteers amongst the membership. However as I indicated last year such a database was always going to be error-strewn, because the old card index was so incomplete. Even now I am still adding items onto the database, that were in store but not accounted for.

It had been hoped that the old book cabinets that were at South Audley Street would have been refurbished in September but because of the delay in the scheduled completion of the building this was not possible. Subsequently the contractor tasked with the job became ill so that his contribution had to be abandoned, fortunately Peter Baker was then able to take the job on and it was completed this January. The Society is indebted to both him and Bill Parker who ably assisted with the lifting of the units.

To accompany our move to the new premises a new library label was produced and affixed to all the journals and books. The old regulations printed on the labels were modified to reflect the Society's changed circumstances, that is, that it is no longer appropriate to state that books may be borrowed at all meetings of the Society. However it was felt reasonable to allow members to have on loan more books than previously, therefore the number was increased from three to five.

Five new tables and five comfortable chairs were also purchased in September, these were immediately used during the week of the major book stocktake.

Martin Albertini has kindly volunteered to produce the book-shelf subject identification labels to a scheme we have both worked out. Recently I have tried to persuade Council that either a major sales drive of the back numbers held of our journals is undertaken or that in the near future some rationalization of both them and our publication stocks is accomplished. Despite the increased size of the new premises the amount of room our own publications continue to take up is growing.

For the future some rationalization of our separates holdings is envisaged together with the better presentation and storage of the remainder. A decision will also be needed as to whether a computer should be purchased for the library to assist in its management. Whether this latter decision is positive or not, when the library database is considered to be more accurate and complete it should be used to form the basis for a new catalogue of the Society's book holdings.

I would like to thank all the many members that helped with the stocktake and relabelling exercise in September. Also I would particularly like to thank John Muggleton, then President, who volunteered to place all the journals in alphabetical order, which was a considerable contribution to bringing order to the library. Thanks are especially due to Peter Chandler for doing most of the co-ordination work in connection with the provision of the new library building. Perhaps my major decision in this connection was to specify no windows, fortunately nobody seems to have noticed them as missing.

S. R. Miles

Curator's Report

The past year has been a varied one. During the first half, the new building was being erected and the situation was as reported last year, only minimal curation taking place on occasional visits to Pickfords' warehouse at Fulham. Then, because of the need for the collection room to be used for temporary storage of the Library after the building became available at the end of August, delivery of the collections was deferred till 24th October. This took place on that date and Pickfords' staff were requested to place cabinets according to a plan previously drawn to scale to maximize the use of the greater (although still somewhat limited) space provided by the new building.

The move in was completed successfully and the furniture was delivered during the following week so that the layout could be completed prior to the first Open Day, held on the day following the Annual Exhibition. A desk, six 2′6″ by 4′ tables, seven adjustable chairs and two reception chairs were obtained, and desk lamps provided at the desk and each table. Five shelves and the Society's noticeboard were secured to the wall with David Young's assistance. Box files were obtained to store correspondence and diaries which had come with various bequests and most of these have been filled and placed on the shelves, along with insect store boxes.

Because of the need to increase the amount of working space for examination of specimens and to augment the seating in the Library for future workshop and other meetings, the provision of tables and chairs has already been maximized and cannot be increased by much. The use of three walls and a central area of the collection room for cabinets has also nearly reached the capacity of the room. Since moving in we have, however, acquired two further collections which have used some of the vacant space remaining.

One of these additional collections is an unusual acquisition for our Society. This is a small collection of fossils, formed by our late member Ted Wild and has been given to us by his widow, at Tony Pickles' suggestion. This collection is housed in three small metal cabinets with a few loose larger items and mostly comprises Mollusca; they are from the Barton Beds of Dorset, the Lyme Regis area, the Isle of Wight and Kentish chalk areas.

The second collection is Russell Bretherton's British and Palaearctic butterflies, which we have acquired on the basis of a loan, renewable every five years, from the Reading Museum. His entire collection, including British larger moths, was bequeathed to the Reading Museum but they have had to keep it in store for the past 18 months pending a decision on their own future. With the assistance of our member David Baldock, who was Russell's solicitor, and of Brian Baker, who has been curating the collection since it arrived at Reading, we came to an agreement with the present Curator at Reading, Leslie Cram, that the collection will be loaned to us on this more or less permanent basis. The first loan period ends on 1st January 1998.

The collection, which has now been transferred to our building, comprises nearly 10 000 specimens. These are housed in three complete cabinets (totalling 45 drawers) and 31 drawers from two other cabinets which also contained moths not required by us. The contents of these loose drawers are to be transferred to space to be made available in existing cabinets and the drawers are to be transferred to Reading. Also with this collection came three drawers of Zygaenidae, including 29 species, and there are 328 species of Palaearctic butterflies. These are mostly European but include some from the Middle East. There are 40 species and many subspecies not otherwise represented in the Society's collections. There are also two drawers containing 25 species of American butterflies. We already had 24 species of North American butterflies (mostly Canadian) from the Stoughton Harris collection, which included 5 species in common.

Since moving in a few problems have arisen, mainly concerning the air conditioning system but fortunately the worst faults arose prior to the collections being installed. This system has progressively been rectified (we have had nine visits by the engineers) and is now giving more confidence about its future reliability. Probably because of the consistently warm temperature, averaging 22 degrees centigrade, the concentration in the atmosphere of naphthalene used as an *Anthrenus* deterrent has been perceived as a problem by some visitors. None has been added to the collections for nine months and it will be progressively reduced and replaced by more regular inspection. The

Open Days have otherwise proved popular, not only among members from the Reading area, and it is gratifying to see the collections being used again.

To make best future use of the space, which will remain finite, reorganization and rationalization of collections will need to continue. It has now been possible to resume this aspect of curation. The arrangement of the beetles from the Henderson and Massee collections in a unified collection, as promised before the move from the Alpine Club, has begun. So far 30 drawers have been laid out, comprising all the suborder Adephaga, as well as the Hydrophiloidea, Histeroidea and smaller families of the Staphylinoidea. Arrangement of the Staphylinidae is in progress.

The collection is being arranged in the order of the 1978 check list, taking into account the additions and other changes published since, with the assistance of a manuscript list of British beetles compiled by John Owen in 1987, for which I am once again grateful to him. For more recent changes *Antenna* has been consulted and some other recent additions and amendments not yet covered in *Antenna* have been gleaned from the literature. This is having to be done without any direct assistance from coleopterists and if any coleopterist is willing to give advice on any aspect, this would be welcomed. All specimens are being retained rather than add to the duplicate collection at present since I cannot be confident that determinations are in all cases correct, critical examination of many groups being desirable in view of recent advances in knowledge.

In order to facilitate this expanded layout of the Coleoptera, the four Hill units housing the Stoughton Harris collection of British and European butterflies and another Hill unit which had housed part of the Coleridge European butterflies, have been made available. The two cabinets housing the Massee collection will then be used to assist in a proposed new arrangement of the Palaearctic butterflies.

The decision was made to transfer the more desirable specimens of British butterflies from the Stoughton Harris collection to fill gaps in the main collection of British butterflies laid out a few years ago by David Moore. The remaining specimens have been placed in the duplicate or sales collections depending on quality. I am grateful to Bill Parker for making this selection. The European butterflies from this collection will be retained and incorporated together with other collections in the new layout I have already mentioned.

Before the arrival of the Bretherton collection, we had one comparatively well arranged Palaearctic butterfly collection (280 species) in two cabinets. This comprises the Lister collection of all families except Lycaenidae, augmented by the Vallins collection of Lycaenidae (which also includes 63 Asian species). Several other collections are scattered about in Hill units and other cabinets. These include the Stoughton Harris collection mentioned previously (133 species), the extensive Coleridge collection (277 species) which had been tightly packed and difficult to use and 19 species of Satyridae (mainly *Erebia*) from the Wright collection. Altogether these collections comprise some 330 species from Europe and North Africa. They will be united and the nomenclature updated. The Torstenius collection, which includes butterflies as well as larger moths, will of course remain separate and because of the loan arrangement regarding the Bretherton collection, it will be necessary to maintain this separately. However, our single drawer of Palaearctic Zygaenidae has already been combined with the Bretherton specimens for convenience as it added 9 species (mostly from North Africa) but was not a viable collection by itself.

Bringing the British moth collection to the same standard as the butterflies will be a future priority. The acquisition in 1991 of the Mackworth-Praed collection, which I reported last year, has given impetus to the need for this as we now have with the Messenger collection three nearly complete collections of larger moths. On the other

hand, we need to substantially improve our collection of Microlepidoptera. I am grateful to several members for pointing out erroneous identifications of micro moths and others no doubt remain undetected.

We have also recently received back the bees which Mike Edwards has had on loan since we moved from the Alpine Club. All specimens have been checked and provided with determination labels. I am very grateful to him for his detailed work on this collection.

In addition to the gratitude already expressed, I also wish to particularly thank Bill Parker, Peter Baker, Brian Baker, Frances Murphy, David Young and the President for assistance and encouragement since we moved in to the new building.

PETER CHANDLER

EDITOR'S REPORT

When thinking about what to say in the 1992 Editor's report, I was tempted to say just 'The same as last year, thank you very much', leave it at that and return to my seat. Because that is precisely all there is to say—more of the same thank goodness.

In 1992, as for the previous five years before it, the journal published 4 approximately quarterly issues totalling 192 pages and four colour plates. I continue to get great satisfaction from editing the material that comes to my desk, and I like to think the journal contains something for everyone. However, all suggestions for improvement will be met with open ears and open mind. One slight bone of contention is that the 'other orders' continue to receive more than their fair share of space in the journal, but this is only because I continue to receive less than my fair share of Lepidoptera articles submitted for publication. I take this opportunity therefore to remind everyone that the Society is lucky enough to be able to finance the publication of colour plates in the journal, whether from photographs, paintings or drawings.

My one regret is that the journal indexes are behind schedule. This is the one task of the year for which it is difficult to find the extra time. A volunteer to take over this aspect of the journal would be warmly welcomed by the editor, and I am sure by all those readers waiting to bind up their issues into volumes. In the mean time, please be patient, one is in preparation at the moment.

R. A. JONES

BOOK REVIEW

Adults and larvae of hide, larder and carpet beetles and their relatives (Coleoptera: Dermestidae) and of derodontid beetles (Coleoptera: Derodontidae) by E. R. Peacock, London, Royal Entomological Society, *Handbooks for the Identification of British Insects* Vol. 5, Part 3, 1993, 144 pages, £20, paperback.—An extremely thorough treatment of these two economically important beetle families, covering both adults and larvae. As well as the usual dichotomous keys, each species is extensively discussed and illustrated. Of the 39 species included, many have never been found 'out of doors' in Britain and some have only occurred as very occasional imports, but these are clearly indicated on the revised check list.

R. A. JONES

Past Presidents

1872–4	J. R. Wellman (dec.)
1875–6	A. B. Farn, F.E.S. (dec.)
1877	J. P. Barrett, F.E.S. (dec.)
1878	J. T. Williams (dec)
1879	R. Standen F.E.S. (dec.)
1880	A. Ficklin (dec.)
1881	V. R. Perkins, F.E.S. (dec.)
1882	T. R. Billups, F.E.S. (dec.)
1883	J. R. Wellman (dec.)
1884	W. West, L.D.S. (dec.)
1885	R. South, F.E.S. (dec.)
1886–7	R. Adkin, F.E.S. (dec.)
1888–9	T. R. Billups, F.E.S. (dec.)
1890	J. T. Carrington, F.L.S. (dec.)
1891	W. H. Tugwell, PH.C. (dec.)
1892	C. G. Barrett, F.E.S. (dec.)
1893	J. J. Weir, F.L.S., etc. (dec.)
1894	E. Step, F.L.S. (dec.)
1895	T. W. Hall, F.E.S. (dec.)
1896	R. South, F.E.S. (dec.)
1897	R. Adkin, F.E.S. (dec.)
1898	J. W. Tutt, F.E.S. (dec.)
1899	A. Harrison, F.L.S. (dec.)
1900	W. J. Lucas, B.A., F.E.S. (dec.)
1901	H. S. Fremlin, M.R.C.S., L.R.C.P., F.E.S. (dec.)
1902	F. Noad Clark (dec.)
1903	E. Step, F.L.S. (dec.)
1904	A. Sich, F.E.S. (dec.)
1905	H. Main, B.SC., F.E.S. (dec.)
1906–7	R. Adkin, F.E.S. (dec.)
1908–9	A. Sich, F.E.S. (dec.)
1910–1	W. J. Kaye, F.E.S. (dec.)
1912–3	A. E. Tonge, F.E.S. (dec.)
1914–5	B. H. Smith, B.A., F.E.S. (dec.)
1916–7	Hy. J. Turner, F.E.S. (dec.)
1918–9	Stanley Edwards, F.L.S., ETC. (dec.)
1920–1	K. G. Blair, B.SC., F.E.S. (dec.)
1922	E. J. Bunnett, M.A. (dec.)
1923–4	N. D. Riley, F.Z.S., F.E.S. (dec.)
1925–6	T. H. L. Grosvenor, F.E.S. (dec.)
1927–8	E. A. Cockayne, D.M., F.R.C.P., F.E.S. (dec.)
1929	H. W. Andrews, F.E.S. (dec.)
1930	F. B. Carr (dec.)
1930	C. N. Hawkins, F.E.S. (dec.)
1931	K. G. Blair, B.SC., F.Z.S., F.E.S. (dec.)
1932	T. H. L. Grosvenor, F.E.S. (dec.)
1933	C. G. M. De Worms, M.A., PH.D., A.I.C., F.R.E.S., M.B.O.U. (dec.)
1934	T. R. Eagles (dec.)
1935	E. E. Syms, F.R.E.S. (dec.)
1936	M. Niblett (dec.)
1937	F. J. Coulson (dec.)
1938	F. Stanley-Smith, F.R.E.S. (dec.)
1939	H. B. Williams, LL.D., F.R.E.S. (dec.)
1940	E. A. Cockayne, D.M., F.R.C.P., F.R.E.S. (dec.)
1941	F. D. Coote, F.R.E.S. (dec.)
1942	S. Wakely (dec.)
1943	R. J. Burton, L.D.S., R.C.S.ENG. (dec.)
1944	Stanley N. A. Jacobs, F.R.E.S. (dec.)
1945–6	Capt. R. A. Jackson, R.N., F.R.E.S. (dec.)
1947	L. T. Ford, B.A. (dec.)
1948	Col. P. A. Cardew (dec.)
1949	J. O. T. Howard, M.A. (dec.)
1950	Air-Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C., F.R.E.S. (dec.)
1951	T. G. Howarth, M.B.E., F.R.E.S., F.Z.S
1952	E. W. Classey, F.R.E.S
1953	F. Stanley-Smith, F.R.E.S. (dec.)
1954	Stanley N. A. Jacobs, S.B.ST.J., F.R.E.S. (dec.)
1955	F. D. Buck, A.M.I.PTG.M., F.R.E.S. (dec.)
1956	Lt-Col. W. B. L. Manley, F.R.E.S. (dec.)
1957	B. P. Moore, B.SC., D.PHIL., F.R.E.S
1958	N. E. Hickin, PH.D., B.SC., F.R.E.S
1959	F. T. Vallins, A.C.I.I., F.R.E.S (dec.)
1960	R. M. Mere, F.R.E.S. (dec.)
1961	A. M. Massee, O.B.E., D.SC., F.R.E.S. (dec.)
1962	A. E. Gardner, F.R.E.S. (dec.)
1963	J. L. Messenger, B.A., F.R.E.S. (dec.)
1964	C. G. Roche, F.C.A., F.R.E.S
1965	R. W. J. Uffen, F.R.E.S
1966	J. A. C. Greenwood, O.B.E., F.R.E.S (dec.)
1967	R. F. Bretherton, C.B., M.A., F.R.E.S. (dec.)
1968	B. Goater, B.SC., F.R.E.S
1969	Capt. J. Ellerton, D.S.C., R.N. (dec.)
1970	B. J. MacNulty, B.SC., PH.D., F.R.I.C.S., F.R.E.S
1971	Col. A. M. Emmet, M.B.E., T.D., M.A
1972	Prof. H. E. Hinton, PH.D., B.SC., F.R.S., F.R.E.S. (dec.)
1973	J. M. Chalmers-Hunt, F.R.E.S
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PROCEEDINGS AND TRANSACTIONS

BOOK NOTICES AND REVIEWS

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Cover illustration: The hoverfly *Episyrphus balteatus* (Degeer) on garden golden rod. Photo: R. A. Jones.

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A RECORD OF *CYDIA INJECTIVA* (HEINRICH) (LEPIDOPTERA: TORTRICIDAE) FROM NORTH ABERDEENSHIRE

K. R. Tuck

The Natural History Museum, Cromwell Road, London SW7 5BD

and M. R. Young

University of Aberdeen, Tillydrone Avenue, Aberdeen AB9 2TN.

In December 1992 Mr Michael Innes found two live adults of a tortricid moth in his home in Peterhead, North Aberdeenshire (vice-county 93). He collected one of these and subsequently it was identified at The Natural History Museum, London, as being a North American species, *C. injectiva*. According to Heinrich (1926) the larva of this species feeds in cones of *Pinus* species, particularly *P. jeffreyi*, and has been recorded from California, Oregon and North Carolina.

A search for the origin of Mr Innes's specimens revealed that his wife had acquired, as decorations, a number of large pine cones from a friend who had recently visited America. One of these cones had several obvious cocoons between its scales and one of the cocoons had pupal exuviae projecting from it. The cone was submitted for identification to Dr Ian Brown, University of Aberdeen, and proved to be from *Pinus jeffreyi*. Unfortunately none of the other cocoons produced moths, but there seems little doubt that these were the source of Mr Innes's specimens.

C. injectiva (Fig. 1) has a wingspan of 15–17 mm. It is a dark greyish brown species with two prominent paler metallic bands across its forewing and is thus unlikely to be mistaken for any British species of *Cydia*. A closely related Nearctic species, *C. piperana* (Kearfott), has an identical biology (Heinrich, 1926) and might also be imported accidentally with pine cones. It is slightly larger than *C. injectiva* and has a more pointed apex to the forewing. The pale bands across its forewing are narrower than in *C. injectiva* and contrast more strongly with the ground-colour of the wing.

Following display of the specimen of *C. injectiva* at the annual exhibition of the British Entomological and Natural History Society on 30 October 1993, Mr Harry Beaumont mentioned that two female specimens of this species were found in a conservatory at Dronfield, Sheffield (vice-county 63) early in 1982 by a lady, a relative of whom had given her some decorative pine cones from the west coast of the USA.

Fig. 1. *Cydia injectiva* (Heinrich).

One of these specimens is now in Mr Beaumont's collection; the location of the other is uncertain.

Mr Innes has kindly donated his specimen of *C. injectiva* to the collection of The Natural History Museum, London.

REFERENCE

Heinrich, C. 1926. Revision of the North American moths of the subfamilies Laspeyresiinae and Olethreutinae. *Bull. U.S. Natn. Mus.* **132**: 1–216.

BOOK REVIEW

Dorset hoverflies by D. A. Levy, E. T. Levy and W. F. Dean, with illustrations by M. J. Levy, published by the authors in association with the Dorset Environmental Records Centre, 1992, 73 pages, paperback, £3.95.—This is the latest county atlas for hoverflies, following on from previous publications for Essex, Staffordshire and Warwickshire. All such atlases are labours of love, though none convey the passion that can be derived from hoverfly recording as much as this one. The booklet provides a brief introduction to hoverflies written for the layman, a section on the history of hoverfly recording in Dorset (with special reference to J. C. Dale, F. H. Haines, C. D. Day, Capt. C. Diver and the Harwoods) and brief accounts of a locality and species of special interest. The remainder of the booklet consists of approximately 200 species maps and species accounts arranged four per page. The maps use a 10-km square grid, though with four dots per square (i.e. 5-km square units). This provides a far better indication of frequency at a county level than 10-km square units. Unfortunately the maps fail to make a distinction between modern and old records, using solid black circles throughout.

The species accounts are short but informative, providing information on Dorset status and habitat preferences, Dorset flight periods, and an indication of when the species was first recorded in the county.

Unfortunately the text is slightly marred by a small number of spelling mistakes, inconsistencies, questionable interpretations of data and minor inaccuracies. Does the expression "common in many varied habitats" actually mean 'common, utilizing a wide variety of habitats'? It seems strange that *Xylotina nemorum* and *Sericomyia lappona* are termed 'locally common' when other species with a similar spread across the county and similar number of new and old localities, such as *Brachypalpoides lenta* and *Volucella inflata*, are termed 'scarce', 'local and thinly spread' etc. Does *Anasimyia lineata*, which has semi-aquatic larvae and a strong association with marshes and water margins elsewhere in Britain, really favour 'heaths and grassland' in Dorset, or is this just clumsy interpretation?

The authors are not shy of challenging accepted thinking and expressing their own opinions, which is a healthy state of affairs in British dipterology. The most controversial statement concerns the attempted sinking of *Cheilosia griseiventris* as a subspecies of *C. intonsa*. This will be widely rejected by dipterists familiar with both species, even if females are particularly troublesome to separate. The use of the subspecies category is itself a contentious matter in such circumstances, and one has to question whether it is within the realms of a non-refereed publication to attempt nomenclatural revision.

Aside from these criticisms, this is a very welcome publication with much new information.

STEVEN J. FALK

EARLY SPRING EMERGENCE OF MACRO-MOTHS IN 1993

S. A. KNILL-JONES

Roundstone, 2 School Green Road, Freshwater, Isle of Wight, Hampshire, PO40 9AL.

After a cold and sunny, but frosty Christmas in 1992 the first two months of 1993 were exceptionally mild in the Isle of Wight causing a very early emergence of the spring moths. January was the dullest month since 1975 and the fifth warmest this century. At Freshwater there was above average rainfall with 97.7 mm and there were only 7 days without rain. The February was the dullest since 1980, was warm with 1°C above average temperature and was the sixth driest this century and the driest since 1959 with only 7.3 mm of rainfall. There were 23 days without rain. March was colder than the previous 2 months with below average rainfall and above average sunshine. The last day of the month was the wettest with 21.0 mm of rainfall and frost occurred on 5 nights during the month.

Four out of the last five winters have been exceptionally mild and the climate seems to be getting warmer, although whether this is due to 'global warming' requires further debate! Only 1991 had a cold spring and could be classed as an 'average' year. These mild winters, resulting in forward springs, caused the emergence of many species up to a month earlier than usual.

The main difference in emergence in 1993 compared with the previous four years was reflected in various *Orthosia* species: *Orthosia munda* (D & S.) and *Orthosia incerta* (Hufn.) were two weeks earlier, and *Orthosia cerasi* (F.), *Orthosia gothica* (L.) and *Orthosia cruda* (D & S.) were 3 weeks earlier. *Agriopis marginaria* (F.), *Alsophila aescularia* (D & S.) and *Apocheima hispidaria* (D & S.) were more than 2 weeks earlier and *Gymnoscelis rufifasciata* (Haw.) and *Eupithecia abbreviata* (Steph.) were a month earlier than in any of the years from 1989 to 1992. Unlike 1989 and 1990, which were exceptionally warm, March 1993 was quite cold and things quietened down with some species e.g. *Anticlea badiata* (D & S.), *Anticlea derivata* (D & S.) and *Trichopteryx carpinata* (Borkh.) being a few days later in emerging.

The most out-of-season appearance was that of *Deilephila elpenor* (L.) which Simon Colenutt took at Chale Green, Isle of Wight, 3 months early on 16.iii.1993. I expect that this example had bred on fuchsia in some local conservatory and had emerged during the warm March sunshine. He also took *Caradrina clavipalpis* (Scop.) at the same locality on 30.iii.1993.

I should like to mention variations in emergence from two other localities on the south coast namely Sedlescombe, East Sussex and Chandlers Ford, Hampshire. At both localities some species were up to 2 weeks early. In particular Patrick Roper noticed that the season got off to an earlier start at Sedlescombe compared to the Isle of Wight, but by the end of the period the island had caught up and had overtaken him. Here both *Orthosia gothica* (L.) and *Orthosia cerasi* (F.) were about 2 weeks earlier than on the island, the latter being taken as early as 7.i.1993 and *Apocheima pilosaria* (D & S.) was 20 days early. Mr Roper suggested that although the season was a very early one, the cold spell in December and the relative mildness of January 'fooled' a few individuals into thinking it was spring. Most of these early records represent singletons, but the main emergence was much earlier than usual too. Barry Goater recorded *Orthosia incerta* (Hufn.) on 27.i.1993 over three weeks earlier than on the island; *Orthosia cruda* (D & S.) 4 days early and there was an exceptionally early record for *Panolis flammea* (D & S.) on 30.i.1993 which was over 6 weeks early, taken at his home at Chandlers Ford.

Table 1. Comparison of 1993 dates with previous years

Species	Earliest date 1993	Locality	Earliest date 1989–1992
Conistra ligula Esp.	18.i	Freshwater	1.i.92
Conistra vaccinii L.	19.i	Binstead	16.i.90
Orthosia cerasi F.	22.i	Binstead	15.ii.89
Scoliopteryx libatrix L.	23.i	Freshwater	17.iii.90
Agriopis leucophaearia D & S.	25.i	Binstead	5.ii.92
Theria primaria Haw.	25.i	Queen's Bower	7.ii.90
Apocheima pilosaria D & S.	27.i	Queen's Bower	7.ii.91
Xylocampa areola Esp.	28.i	Freshwater	3.ii.92
Agriopis marginaria F.	29.i	Queen's Bower	17.ii.91
Orthosia gothica L.	29.i	Queen's Bower	21.ii.90
Alsophila aescularia D & S.	29.i	Binstead	16.ii.90
Biston strataria Hufn.	29.i	Freshwater & Binstead	12.ii.92
Eupsilia transversa Hufn.	31.i	Freshwater	27.ii.90
Orthosia cruda D & S.	1.ii	Binstead	26.ii.92
Gymnoscelis rufifasciata Haw.	6.ii	Freshwater	6.iii.90
Lithophane ornitopus Hufn.	11.ii	Binstead	22.ii.92
Cerastis rubricosa D & S.	11.ii	Binstead	—
Eupithecia abbreviata Steph.	15.ii	Binstead	17.iii.90
Ectropis bistortata Goeze.	15.ii	Firestone Copse Havenstreet, at dusk	7.iii.90
Orthosia munda D & S.	16.ii	Binstead	2.iii.90
Selenia dentaria F.	17.ii	Freshwater	23.ii.90
Apocheima hispidaria D & S.	18.ii	Binstead	6.iii.91
Orthosia incerta Hufn.	18.ii	Freshwater	3.iii.92
Anticlea badiata D & S.	5.iii	Firestone Copse Havenstreet, at dusk	1.iii.90
Archiearis parthenias L.	9.iii	Firestone Copse flying in sunshine	—
Achlya flavicornis L.	11.iii	Binstead	27.ii.92
Phlogophora meticulosa L.	13.iii	Firestone Copse & Niton	4.i.92
Panolis flammea D & S.	16.iii	Binstead	18.iii.92
Deilephila elpenor L.	16.iii	Chale Green	—
Anticlea derivata D & S.	20.iii	Combley Great Wood Havenstreet, at dusk	26.iii.90
Trichopteryx carpinata Borkh.	21.iii	Firestone Copse & Chale Green	17.iii.90
Lithophane semibrunnea Haw.	21.iii	Freshwater	3.iii.92
Caradrina clavilpalpis Scop.	30.iii	Chale Green	—

Total number of species recorded = 33.
All specimens were recorded at mercury vapour light unless stated otherwise.
A dash indicates that the species was not taken between 1989 and 1992.
Total number of species recorded on the Isle of Wight between 1989 and 1993 = 51.

Southerly winds blew in early February but there were no records of any migrants during this period.

In comparison the emergence of the spring butterflies was about 3 weeks later than in the very forward year of 1990 with the first *Pararge aegeria* (L.) and *Pieris brassicae* (L.) being observed at Ryde on 6.iv.1993. Amongst the hibernating butterflies, a very early *Vanessa atalanta* (L.) was seen by Simon Colenutt flying in the sunshine at Chale Green on 18.i.1993. This butterfly may have been disturbed

from hibernating quarters, perhaps suggesting that it does hibernate in this country during very mild winters. *Aglais urticae* (L.) and *Inachis io* (L.) were seen on one of the few sunny days in February on the 13th at Freshwater.

This was certainly an exceptional winter, with daffodils out during mid-December 1992 at Mottistone, Isle of Wight, and during mid-January at Freshwater. The hedges were green by the end of March and of the trees, the horse chestnut was well out by this time.

Brian Warne recorded a total of 113 macro-moths of eleven species at mercury vapour light on 5.iii.1993 at Binstead, quite a remarkable total for that time of year. The colder month of March put a damper on a very early spring, but the first 2 months will be especially remembered for the exceptional early emergence of many moth species.

Acknowledgements

I should like to thank my mother for reading and commenting on the manuscript and Messrs S. Colenutt, B. Goater, N. Holland, F. A. Joiner (Meteorology), P. Roper, B. J. Warne, E. Wilcox and D. B. Wooldridge for their records and information which has made the compilation of this paper possible.

Reference

Knill-Jones, S. A. 1991. A comparison of the early spring emergence of the macro-moths 1989–1991 taken at Freshwater, Isle of Wight at Mercury Vapour Light. *Br. J. Ent. Nat. Hist.* **4**: 129–131.

BOOK REVIEWS

Larger moths of the London area, by C. W. Plant, London, LNHS, 1993, 314 pages, £19.95, hardback.—This long awaited volume on the moths of London, has been well worth the wait that it has taken to compile the records and blend them into a comprehensive work.

The book opens with a foreword by Bernard Skinner. There then follows an introduction which discusses the geology of the area, moth habitats in London, past recording, the present work and the validation of records. The next few pages are devoted to an introduction to the species accounts which is divided into eighteen sections and cover immigrants, vagrants, local residents, larval foodplants etc. There then follows a list of sources and abbreviations with acknowledgements being the last page of 'prelims' before the work proper begins. Two-hundred and twenty-two individual entomologists, 11 Natural History Societies, Museums, Conservation units etc are listed who supplied records for this work.

The area covers Middlesex, and parts of Hertfordshire, North Essex, Buckinghamshire, South Essex, Surrey and West Kent.

The 715 macrolepidoptera recorded are divided species by species into number according to Bradley & Fletcher (1986) followed by the Latin name of the insect with subspecific name, English name and dates from first record to 1990 or later. There is a short comment on how local, rare or common the species is and its status as resident, migrant etc. There is also a description of the food plant, a map of the species distribution, how it can be recorded and what type of locality it prefers. For less common species, the names of the persons who discovered the insect are given. The

records are shown on the maps as open or closed circles; the closed circles indicating records from 1.i.1980 to 31.xii.1990 and the open circles indicating records before these dates. A loose transparent overlay allows superimposition of geological, political and biological details onto each distribution map.

The last 56 pages are taken up by a comprehensive checklist, the number of tetrads in which each species is recorded 1980–1990, the code of conduct for insect collectors, a gazetteer, a description of the overlays, a glossary and some useful addresses. An index lists the scientific and English names of all the species in the book.

I can well recommend this book as I know what hard work went into it. I liaised with Colin Plant with my own records and saw at first hand the amount of work involved with the computer side of the operation.

Roy McCormick

The development and evolution of butterfly wing patterns by H. Frederik Nijhout, Washington and London, Smithsonian Institution Press, 1991, xvi + 298 pages, £17.50, paperback.—The idea that all butterfly wing patterns can be derived from a 'basic' form is not new. Schwanwitsch (1924) and Süffert (1927) were the first to make such a proposal. Although this particular area of study seems to have fallen out of fashion, Nijhout delivers his synthesis in the light of modern thinking and includes use of much recently presented material.

By examining wing pattern variation both within a particular species and between closely related species, Nijhout and his predecessors have created a 'nymphalid ground plan', a basic pattern of bands from which analogous (or homologous?) bands can be identified in all other nymphalid butterflies. It might be pointed out here that 'nymphalid' in the sense of this book follows the modern interpretation of the family, including also the Satyrinae (browns), Danainae (milkweeds) as well as the various tropical and subtropical subfamilies Heliconiinae, Charaxinae, Morphinae and the like.

After initially considering how colours and patterns are laid down during development in the pupa, and examining how various symmetries across the wings are related between different species, the author goes into slightly more technical detail by showing how most butterfly patterns can be analysed down to the level of the individual wing cells. Using mathematical models and computer simulations, the pattern themes generated are precisely representative of actual patterns occurring throughout the Nymphalidae. The constant theme of analysing wing patterns with reference to a basic ground plan continues throughout the book and is explored in the context of genetics, mimicry and evolution.

There is a single chapter in which mathematical models are considered, but even here the reader is assisted by plenty of line figures and diagrams which convey the messages simply and carefully even if the few formulae are rather technical. The author has a very gentle and readable style, and the book makes easy and fascinating reading. Although not a lepidopterist, I found the topic freshly enlightening and it immediately enthused me to consider the wider implications of the theory on colour patterns in all manner of insects. Anyone interested in pattern formation, variation or aberration in the Lepidoptera (moths as well as butterflies) will discover in this excellent book a whole new light to throw upon their studies.

Richard A. Jones

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Schwanwitsch, B. N. 1924. On the groundplan of wing-pattern in nymphalids and certain other families of rhopalocerous Lepidoptera. *Proc. Zool. Soc. Lond. Ser. B* **34**: 509–528.

Süffert, F. 1927. Zur vergleichende Analyse des Schmetterlingszeichnung. *Biol. Zentralblatt* **47**: 385–413.

PARAKIEFFERIELLA WUELKERI N. SP. (DIPTERA: CHIRONOMIDAE) FROM WESTERN EUROPE AND NORTH AFRICA

JOEL MOUBAYED

Les Mûriers Bt A, 3 Imp. Enclos de l'Herbette, 34000 Montpellier, France.

Wülker (1957) described the pupa of this new species as *Parakiefferiella* sp. d from specimens collected in Spain (Rio Guadarrama, near Madrid; a river near Malaga) and partially described the female from a pharate adult. Material from northern Algeria (Oued Boubchir, a temporary affluent of the river Sebaou) allows a full description of the adult male and female.

Abbreviations used. AR antennal ratio: ratio of length of apical flagellomere divided by the combined length of the more basal flagellomeres. VR venarum ratio: ratio of length of Cu to length of M. SCf sensilla campaniformia. LR leg ratio: ratio of metatarsus length to tibial length. SV ratio of femur plus tibia length to metatarsus length. BR ratio of longest seta of tarsal segment 1 divided by minimum width of tarsal segment 1. HR hypopygium ratio: ratio of gonocoxite length to gonostylus length. HV hypopygium value: ratio of total body length to length of gonostylus times 10.

DESCRIPTION

Parakiefferiella wuelkeri n. sp.

Type material. Holotype adult male, rhithral of Oued Boubchir, affluent of River Sebaou, Algeria, 30 m above sea level, 17.iii.87; paratypes, three adult males, three pharate adult males, same data as holotype. Holotype and paratypes deposited in Zoologische Staatssammlung, Munich.

Adult male (n = 3), total length 1.8–2.0 mm. Brownish; mesonotal patches brown, halteres pale.

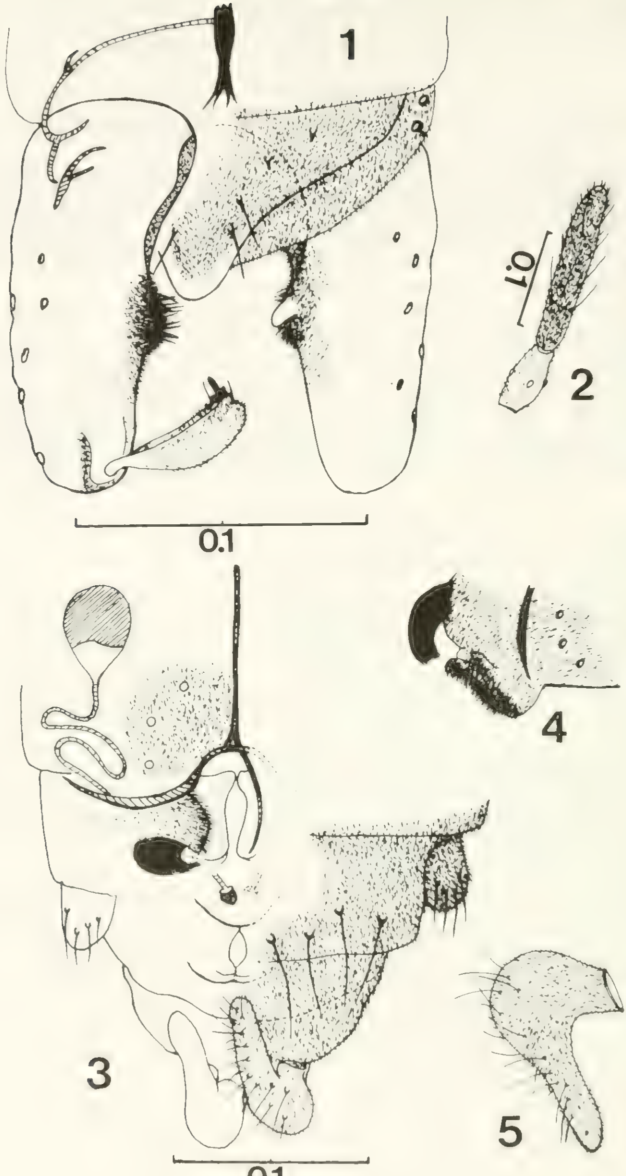
Head. Antenna length 670–685 μm, AR 0.40–0.45, 13-segmented, ultimate flagellomere 167–169 μm long. Four postorbitals, 75 μm long. Orbitals and outer verticals absent. Cibarial pump 103–109 μm long. Tentorium 105 μm long, 12 μm wide. Eyes bare. Palp segments 27, 29, 38–44, 50–54, 56–74 μm long; sensilla clavata absent. Clypeus with 6–7 setae (66 μm long).

Thorax. 3 antepronotals, 5–6 acrostichals, 4–5 dorsocentrals, 3 prealars, and 3 scutellars in one row. Wing 1.23–1.24 mm long, VR 1.30–1.35; membrane with fine granulation visible at 200×; SCf 1–2; veins and squama bare; Cu2 strongly curved for apical half. Legs: second and third segments of hind tarsi subequal; mean length (μm) and proportions:

	fem	tib	tar 1	tar 2	tar 3	tar 4	tar 5	LR	BV	SV	BR
Pair 1	369	478	247	178	111	69	63	0.52	2.60	3.43	2.6–2.8
Pair 2	413	384	167	112	98	51	54	0.43	3.06	4.77	2.7–2.8
Pair 3	403	456	217	137	136	63	59	0.48	2.72	3.96	3.6–3.8

Abdomen. Setae of tergites I–VIII uniformly distributed, on each side: I 6, 3/3; II 8, 4/4; III 8, 4/4; IV 8, 4/4; V 10, 5/5; VI 8–10; VII 8–10; VIII 10–12.

Hypopygium (Fig. 1). Anal point 34–37 μm long, very broad, maximum width 36–46 μm, width at apex 15–18 μm, rounded apically and bearing 4–7 setae. Virga 34–42 μm long. Inferior volsella triangular with a very characteristic thumb-like lobe 4–6 μm long, transparent and rounded apically, its ventral margin with 10–12 stout



Figs 1–5. *Parakiefferiella wuelkeri*. Male, 1: hypopygium dorsal and ventral. Female, 2: last two flagellomeres of antenna, 3: genitalia, dorsal and ventral, 4: lobes of gonapophysis VIII, lateral view, 5: cercus, lateral view scales in mm.

setae. Gonostylus 48–54 μm long, of normal *Parakiefferiella* type, curved medially and without crista dorsalis; apical tooth 9–11 μm long. HR 2.55–2.65. HV 3.73.

Female imago (n = 2). Material: three female imagines, three pharate adult females; same data as holotype. Material deposited in Zoologische Staatssammlung, Munich. Total length. 1.9–2.1 mm. Brownish; mesonotal patches clearer than in male, last flagellomere of antenna darkened.

Head. Antenna 5-segmented, 237 μm long, AR 1.10–1.15, last flagellomere 89–94 μm long, uniformly elongated (Fig. 2), maximum width 17 μm; sensillum chaeticum present. Palp segments 18, 32, 44, 76 μm long.

Wing. 1.145–1.165 mm long.

Genitalia (Fig. 3). Tergite IX with 6–8 setae; sternite VIII with 3 setae. Gonocoxite 32–34 μm long, bearing 5–6 setae. Seminal capsule 42–49 μm long, 30–33 μm wide, pear-shaped, sclerotized for apical 28–32 μm. Notum 95–98 μm long. Lobes of gonapophysis VIII as in Figs 3 and 4, ventrolateral lobe triangular in both dorsal and lateral view. Cercus (Fig. 5) 73–75 μm long, with 16–20 setae, hook-like in lateral view.

Remarks

Parakiefferiella wuelkeri n. sp. and *P. dentifera* Wülker are very similar species. They resemble each other in the following characters: male imago—shape of anal point and lobe of inferior volsella; pupal exuviae (Wülker 1957, Langton 1991)—general ornamentation of abdominal segments. However, *P. wuelkeri* is easily distinguished from *P. dentifera* by the following combination of characters: male imago—lobe of inferior volsella thumb-like in *P. wuelkeri*, nose-like in *P. dentifera*; pupal exuviae—tergite II without trace of hook row in *P. dentifera*. The genitalia of *P. wuelkeri* differ from other described females in this genus (Sæther 1977, Moubayed 1991), delimiting a separate group within the genus on the following two principal characters: shape of ventral lobe of gonapophysis VIII (triangular in *P. wuelkeri*, rounded in other species), and setation pattern of tergites VIII and IX.

Ecology and distribution

P. wuelkeri inhabits lowland parts of temporary small rivers (Oued). In Algeria the maximum emergence is in March and April. It is known only from south west Europe: Spain (Wülker, 1957), Tunisia (Boumaiza & Laville, 1988) and Morocco (Azzouzi *et al.*, 1992). Due to its very limited geographical distribution, this species probably represents, as with *Cricotopus beckeri* Hirvenoja (Hirvenoja & Moubayed, 1989), a Tyrrhenian faunal element essentially confined to the western subregion of the western Mediterranean.

Acknowledgements

I am very grateful to Drs D. Daoudi, A. Lounaci and S. Ait-Mouloud (Tizi-Ouzou, Algeria) for collecting *Parakiefferiella* material in northern Algeria.

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BOOK REVIEW

Monitoring butterflies for ecology and conservation by E. Pollard and T. J. Yates, London, Chapman and Hall, 1993, xiv + 274 pages, £35, hardback.—Since the butterfly monitoring scheme was started up at Monks Wood in 1976 by Ernest Pollard and Jeremy Thomas, butterfly counts have become, for many professionals and amateurs alike, a regular part of summer life. This book details the methods and aims of weekly butterfly counts and discusses those aspects of butterfly biology that can be, and have been, elucidated from the accumulated data of the counts. Over 90 sites throughout Britain are now recorded by the transect method (walking along a set route once a week monitoring the butterflies within an imaginary 5 metre box ahead of the walker).

It is quite a revelation to read just how much can be gleaned from the raw data of these walks. Part of the book is devoted to the broad biological aspects of the results such as migration patterns, flight periods, stability or otherwise of local and national distribution, and influence of weather on population size. The most striking finding has been the close synchrony in rise and fall of many butterfly populations from year to year across all the recording locations. This suggests that local factors (e.g. predation/parasitism) are of little significance compared to one overall factor (i.e. the climate). In several places in these chapters the authors can draw only partial conclusions as more distinct and clear patterns will emerge as the data accumulates over the years.

Later chapters look at a number of widely distributed and local species, considering their absolute abundance and changes thereof, effects of weather, and flight periods. A selection of monitored sites are then examined in relation to how butterfly populations fluctuate over time with changes in habitat.

Butterfly counts do not give the detailed results of individual population studies, but their broader picture of trends in populations is a new perspective. It is a source of envy in other countries just how well documented is the fauna and flora of our islands—better than anywhere else in the world. These present studies have added a new layer of information to our knowledge that nevertheless indicates just how much we still have to learn about even our commonest butterflies.

This book is well laid out with clear graphs and tables and a few monochrome pictures. Whilst heavy with data and thoughts based on it, the information is wisely split up by frequent subheadings in each chapter, making it easy to dip into. The fact that this is, effectively, an intermediate 'state of play' assessment of a continuing study and not a finished reference book no doubt influences its high price; it is not perhaps a book that every general naturalist will purchase. It is however a very well presented examination of current work and a valuable contribution to our developing understanding of this best studied group of insects. All who read it will find that, when it comes to thinking about butterfly biology in a broad sense, their horizons will have been expanded.

RUPERT BARRINGTON

A REDESCRIPTION OF *PARAKIEFFERIELLA* SP. D. WÜLKER, THE PUPA OF *PARAKIEFFERIELLA WUELKERI* MOUBAYED (DIPTERA: CHIRONOMIDAE), A SPECIES NEW TO BRITAIN

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Wülker (1957) described the pupa and female of a *Parakiefferiella* species from two rivers in Spain: Rio Guadarrama, north-west of Madrid and an unnamed river west of Malaga. He refrained from naming the species, because the female could be only partially described from a pharate adult and no adult males had been obtained. Associated material from northern Algeria has enabled Moubayed (1994) to describe the male and female adults. Pupal exuviae from Oued Sebaou (downstream from the type locality), Oued Sarrath, Tunisia, and Carie Burn, Scotland, allow an amplification of Wülker's description.

DESCRIPTION OF PUPA

Length 2.1–2.7 mm (n = 22). Transparent colourless to faintly golden-brown, especially along the posterior transverse point bands of tergites II–V.

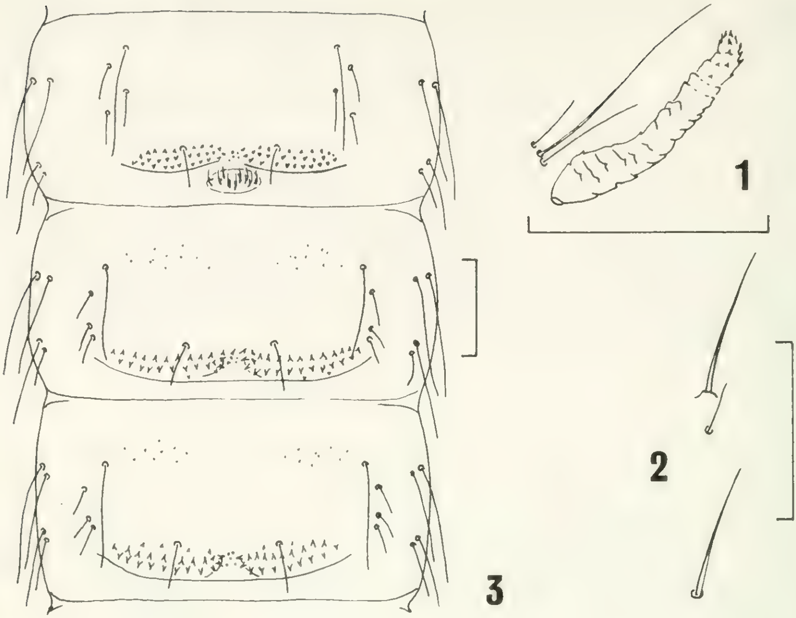
Cephalothorax. Cephalic tubercles very shallow, terminating in a short conical or parallel-sided papilla. Frontal setae 100–140 μm long (n = 6). Suture anteriorly rugosely granulate. Thoracic horn (Fig. 1) 90–160 μm long, 3.9–8.8 times as long as broad (n = 18), scaled from near base, the scales grading to teeth at horn apex. Lateral antepronotal setae 120 and 105 μm long (n = 1), thicker than the median antepronotal setae, about 1 μm thick at base. Median antepronotal setae 60–93 and 75–110 μm long (n = 3), very thin, less than 1 μm thick at base. Precorneal setae 30–60, 85–110, 33–65 μm long (n = 7), the long middle seta about 1.5 μm thick at base, the other two very thin. Only three dorsocentral setae (Fig. 2), the first and third spine-like, the second thin; 60–73, 33–70, 50–75 μm long (n = 5).

Abdomen (Fig. 3). Tergite I unarmed. Tergites II–VII with a posterior transverse band of points, strongest on III, the points decreasing in size and extent to VII. On tergite II the posterior band is broken medially to accommodate a small circular patch of anteriorly directed hooks. The posterior band is narrowly broken on tergites III–VII, but the gap is bridged by small points. Tergites III–VI have an additional anterolateral patch of small points. Tergites VIII and IX unarmed. Sternite VIII armed anterolaterally with a patch of small points; an indication of such patches may occur on sternites VII and VI. Each anal lobe drawn out posteriorly into a short to long, curved, smooth or minutely toothed "tail". Each anal lobe 2.1–3.1 times as long as broad (n = 15). Anal macrosetae 70–80 μm long, 0.24–0.48 length of anal lobes (n = 11). Male genital sacs extend nearly to tip of anal lobes.

Abdominal chaetotaxy:

	I	II	III	IV	V	VI	VII	VIII
D	5	5	5	5	5	5	5	2
L	2	4	4	4	4	4	4	3 (2)
V	2	4	4	4	4	4	4	1

Lateral setae 1–3 of segments II–VII strong, stiff; seta 4 small and weak. Anterior lateral seta of segment I strong, posterior seta very small. Pedes spurii A present on segments IV–VI; pedes spurii B absent.



Figs 1–3. *Parakiefferiella wuelkeri* pupa. 1: thoracic horn and precorneal setae, 2: dorsocentral setae, 3: segments II–IV dorsal, scale = 0.1 mm.

Systematics

The pupa of *P. wuelkeri* differs from the generic diagnosis given by Coffman *et al.* (1986) in a number of respects: one long and two short precorneal setae instead of the usual two long and one short, three dorsocentral setae instead of four, hook row of segment II present, and pedes spurii B absent. Other species of *Parakiefferiella* may lack pedes spurii B (Langton, 1991), but in respect of the other three characters *P. wuelkeri* is unique.

Distribution and habitat

The main centre of distribution would appear to be western Mediterranean (Moubayed, 1993); in northwest Africa it is characteristic of temporary lowland rivers and streams. The species is, however, much more widespread, for pupal exuviae were collected by Jane Atkins and Sandra Hogg, 14.v.1985, in Carie Burn, a 4-metre wide permanent stream flowing rapidly down to Loch Rannoch, Scotland. There is also a specimen in the Zoologische Staatssammlung, Munich, from the Forggensee at Füssen, south Germany, in the northern foothills of the Alps.

Acknowledgements

I am most grateful to Dr J. Moubayed, Dr H. Laville, Jane Atkins and Sandra Hogg for the gift of specimens, and Dr F. Reiss for loans from the Zoologische Staatssammlung, Munich.

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BOOK REVIEW

The moths and butterflies of Great Britain and Ireland, Vol. 7, Part 2, (Lasiocampidae–Thyatiridae, with life history chart of the British Lepidoptera) edited by A. M. Emmet and J. Heath, Colchester, Harley Books, 1992, 400 pages, 8 col. plates, £27.50, paperback.—This volume is divided into three sections. The first 50 pages are devoted to two chapters, the first on the classification of the Lepidoptera by M. Scoble, the second on the resting posture in Lepidoptera by the late M. Tweedie and A. M. Emmet. The first chapter deals initially with the history of classification, and this is followed by its modern development. It is made clear that further changes will be made in the light of research. Chapter 2 is accompanied by four coloured plates of excellent photographs illustrating the resting poses of thirty-two British Lepidoptera; these are not life size, but the legend gives the actual size of each insect.

The main section, over 200 pages, comprises charts outlining the life history and habits of the British Lepidoptera. The life cycle on a monthly basis is given, but additional information covers such subjects as diapause, pupal site, type of cocoon, status of species (using eight categories), distribution (based upon eleven major regions which include the Channel Islands), habitat (based on twelve major types, most of which are subdivided), flight time of moth, larval foodplants, conservation, including legislation, and Red Data Book category. Much of the information is portrayed by symbols.

The final section of the volume continues with the description and life history of the British moths—the families Lasiocampidae to Thyatiridae—by B. Goater and M. Young. The species are illustrated by four coloured plates. For each native species the text is accompanied by a map based on 10-km squares of the National Grid.

The introductory chapters make a valuable contribution. It is interesting to read that the neotropical family *Hedylidae*, whose species were formerly included in the *Geometridae*, has recently been included in the butterflies, and some of the species possess bipectinate antennae! The reason why is given. In Chapter 2 one learns that Linnaeus based his classification of moths, except the hawk-moths, largely upon their resting positions.

Evidently considerable effort has been made to ensure that the life history charts are accurate. Second thoughts have prevailed regarding several statements made in previous volumes, and corrections made. Thus in Volume 9 *Acronicta psi* (L.) is

stated to be bivoltine, while in the present volume it becomes univoltine in line with other authorities. Should not *A. tridens* (D & S.) have been similarly amended? *Orgyia antiqua* (L.) now appears, perhaps controversially, as bivoltine in the south, having lost its occasional third generation postulated in Volume 9. However, some curious relics of imagination from the earlier volume remain. *Laothoe populi* (L.) certainly has a second generation in S. E. England, but not in autumn. This is one of a series of scientific books of considerable quality, and therefore one expects to find the term autumn used as commencing at the autumnal equinox, although some popular conceptions of autumn include the whole of September. In either case the statement regarding *L. populi* remains invalid. In S. E. England the two broods usually coalesce, second generation specimens flying in late July and the whole of August. Chalmers-Hunt (*The butterflies and moths of Kent*, 1962) mentions this bivoltinism, stating that the partial second generation occurs in August, and he cites only one record later than this, and that for September 1st! Similarly, the occasional supposed second generation specimen of *Deilephila elpenor* (L.) does not occur in the autumn; C. Plant (*The larger moths of the London Area*, 1993) notes that in some years there is a partial second brood in early August. An omission noted is that *Hecatera bicruris* (Hufn.) is listed as having only one generation; in southern Britain it has two.

The final column of the life history charts might have been more instructive in relation to larval foodplants. For a number of species whose larvae have distinct preferences, e.g. *Arctia caja* (L.) and *Spilosoma lubricipeda* (L.), one finds no better information than 'polyphagous on herbaceous plants', and referring to the systematic section (Vol. 9) is of no avail, it is equally unhelpful! *Acronicta aceris* (L.) and *Ceramica pisi* (L.) provide two curious instances of the omission of a major larval pabulum. The plane tree is probably the mainstay of the former moth in the London area, while the English as well as the scientific name (*pisum*—pea) of *C. pisi*, the broom moth, relates to the frequency of the larva being found on the shrub of this name. Neither of these is listed in the life history chart or in the systematic section in the relevant volume.

The short systematic section continues from previous volumes with emphasis on identification keys and excellent descriptions of the insects, including their immature stages, definitions of families, in each case illustrated by a diagram of wing venation, and genera. There is good coverage of geographical forms, seasonal and sexual dimorphism and melanism, and some aberrations are considered. Regarding distribution, the text and accompanying distribution maps are sometimes at variance; the former lists Counties Galway, Mayo and Sligo for *Tetheella fluctuosa* (Hübn.), which is correct, but the maps do not corroborate this. Nevertheless even if the latter are not up to date they portray well the general pattern of distribution. Of the four colour plates, numbers 1 and 4 are too pale; on plate 1 the colour of the illustrations of *Lasiocampa trifolii* (D & S.) from Cornwall and the Isles of Scilly is far removed from the deep chocolate hue they actually possess.

The few criticisms made are insignificant when placed in perspective. The book is strongly bound and clearly printed on good quality paper; it has an attractive presentation. It contains an enormous wealth of accurate information on the whole of the British Lepidoptera which is well indexed and there is an adequate bibliography. Finally, however, viewing this volume as one of a series one must question the placing of the small systematic section of five families in it; surely it would be better located in one of the volumes concerned with the macrolepidoptera, if indeed it be not imperative.

B. K. West

KALIOFENUSA CARPINIFOLIAE LISTON (HYMENOPTERA: TENTHREDINIDAE), A NEWLY RECOGNIZED LEAF-MINER ON FIELD ELMS IN BRITAIN

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Three European leaf-mining sawflies of the genus *Kaliofenusa* Viereck are attached to elm (*Ulmus*) species (Liston, 1993). When the group was first revised, the only British material available to the author was of Scottish origin and exclusively from wych elm (*U. glabra* Hudson). Now it has been possible to study material collected in England, made available by the Natural History Museum, London (NHM) and National Museums of Scotland, Edinburgh (NMS). Two species are represented in this material, one being an addition to the British list of Hymenoptera Symphyta.

IDENTIFICATION

The sawsheath characters mentioned in Liston (1993) are of limited value in the separation of species and might mislead. After examination of longer series of each species, it seems that the sawsheath valvulae of these rather small insects may be prone to severe distortion in dried specimens. By contrast, the form of the frons is very stable and specimens intermediate to *ulmi* and *carpinifoliae* have not been found. Both species key to *Fenusa ulmi* in Benson (1952).

Dr E. Altenhofer sent samples of larvae collected on *U. minor* Miller and *U. glabra* from several central European localities. Apart from the tendency, already observed by Altenhofer in the fresh samples, to a more intense and extended dark coloration on the thoracic segments in the *U. minor* (?*K. carpinifoliae*) samples, no absolute characters were found to separate the larvae. There is however a slight doubt as to the purity of the samples, and the larvae would warrant a study with more sophisticated equipment than that available to the author.

SEPARATION OF BRITISH *KALIOFENUSA* SPECIES

A: Frons with lateral walls appearing deeply indented (Fig. 1). Lateral foveae contained in short, deep ellipsoid furrows which do not run out past the upper edge of the frontal wall (Fig. 1). Apical segment of flagellum more than 1.5 times length of the preceding segment (Fig. 3).

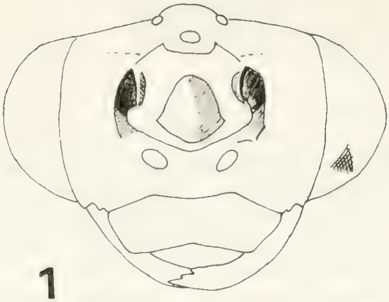
On field elms (*U. minor*, *U. procera* Salisbury), and possibly hybrid elms. Leaf-mines starting mostly in leaf margins (Figs 5–7). . . . . . . *carpinifoliae* Liston, 1993

B: Frons with lateral walls nearly straight-sided (Fig. 2). Grooves containing lateral foveae long and narrow, furrowed through above to run on to upper surface of head (Fig. 2). Apical segment of flagellum shorter than 1.5 times the length of preceding segment (Fig. 4).

On wych elm (*U. glabra*). Leaf-mines starting mostly in leaf blade interior (Fig. 8). . . . . *ulmi* (Sundevall, 1847)*

*The date, 1847, is correct, although 1843 (or 1844) is usually wrongly given. The publication is the 'Transactions of the 4th meeting of Scandinavian natural historians in Christiania', 1844, but it was not published until 1847. The British list (Kloet & Hincks, 1978) contains a couple of printing errors and the date given for *K. ulmi* (1884) is probably a typographic error for the equally incorrect 1844, likewise Sundewall instead of Sundevall.

Students of the Symphyta might also be interested to know that nearly all the dates of publication for Klug species are wrong in the checklist! The original error, copied throughout the European literature lies mostly with Kreichbaumer (1884) who reprinted Klug's works in a single volume but with the dates of the volume year, not the *actual* year of publication (often a few years later).



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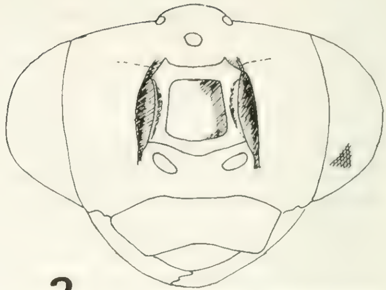

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Figs 1 and 2. Head viewed from front to show form of frons in 1: *Kaliofenusa carpinifoliae*; 2: *K. ulmi*.
Figs 3 and 4. Apical flagellar segments of 3: *K. carpinifoliae*; 4: *K. ulmi*.

Material examined

Kaliofenusa carpinifoliae Liston

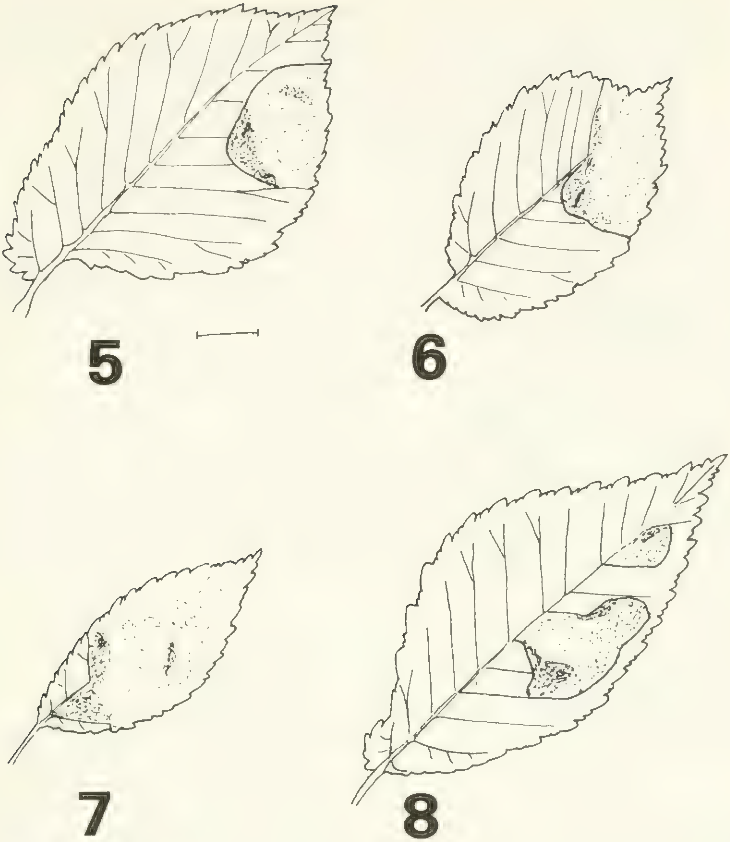
England: 1 female, Sudbury, Suffolk, 1919 (Harwood, Natural History Museum—NHM); 1 female, Badingham, Suffolk, 5.vii.1927 (R. B. Benson, NHM): 4 females, Wimborne, Dorset, 10.v.1936 (B. Rings, NHM); 1 female, Colchester, Essex (Harwood, NHM); 1 female, Reading, Berks., ex mine on *Ulmus procera*, coll. 4.vi.1992 em. 11.vi.1993 (B. J. Parsons/M. R. Shaw, National Museums of Scotland—NMS); 1 male, without locality or date, ex Cameron Collection (NHM) may be of British origin.

Kaliofenusa ulmi (Sundevall)

England: 1 male, "Gorge Avon", 1903 (J. J. F. X. King, NHM); 1 female, Gade Valley, Herts., 20.v.1934 (R. B. Benson, NHM); 1 female, Boxhill, Surrey, 9.v.1936; 1 female, Claygate, Surrey, 11.v.1937 (J. F. Perkins, NHM); 1 female, Tring, Herts., 21.iv.1946 (R. B. Benson, NHM); 3 females, Beetham, Cumbria, mine on *Ulmus glabra*, coll. 13.vi.1992 em. 17.v.1993 (M. R. Shaw, NMS).

Biology

In Continental Europe, *carpinifoliae* has been reared only from *Ulmus minor* (= *carpinifolia* Gleditsch) (Altenhofer, 1980). The record from Reading shows that *U. procera* (English elm) is also used as a host. From Perring & Walters (1962), it appears likely that the host of *carpinifoliae* in East Anglia may have been *U. minor* or *U. procera*, but in the other localities most probably *U. procera*.



Figs 5–8. Completed leaf-mines, scale line = 1 cm. 5: *U. procera/?K. carpinifoliae*, Reading, England; 6: *U. minor/K. carpinifoliae*, Gottfrieding, Bavaria; 7: *U. minor* var. *sarniensis/?K. carpinifoliae*, Edinburgh, Scotland; 8: *U. glabra/K. ulmi*, Cumbria, England.

In a sample of mined *U. procera* leaves from which the Reading *carpinifoliae* specimen was obtained, the mines start almost exclusively in the leaf blade margins (Fig. 5). The position of mines in *U. minor* leaves in Germany is similar (Fig. 6), where however the fully developed mine often takes up the whole content of the usually smaller leaves of this elm. Fresh mines often start at or close to the leaf tip. Empty *Kaliofenusa* leaf-mines on *U. minor* var. *sarniensis* (Loud.) Rehd. (Wheatley elm) in Princes Street Gardens, Edinburgh, August 1992 were of this type (Fig. 7).

Oviposition of *K. ulmi* typically takes place in the leaf blade interior; even the completed mines often do not touch the leaf edge (Fig. 8). Because the collection of Reading mines was heavily parasitized by a *Lathrolestes* sp. (Ichneumonidae: Ctenopelmatinae) (M. R. Shaw, pers. comm.), it was not possible to establish whether the few mines in the leaf interiors of *U. procera* were indeed made by *K. ulmi*.

Dr D. R. Smith (pers. comm.) has discovered that the *K. ulmi* populations introduced to North America feed there on at least three elm species which are probably less closely related to one another than are the European elms named here. Nevertheless it seems unwise to extrapolate Smith's findings (which he intends to publish in detail) back to the native European populations. To contend that *ulmi* should feed on all elms present in Europe because it does so in North America is premature in the light of 'regional foodplant change' (Zwölfer, 1970), by which is meant a complex of biotic and abiotic influences which leads to the selection of different hostplants in different parts of the same insect species' range. More data from rearing would help to clarify these problems.

At least in the short term, the future of these sawflies seems well assured despite the continuing destruction of older elms by Dutch elm disease. An abundant food resource is supplied by the sucker regrowth of diseased elm trees. This juvenile type growth is preferentially used by *Kaliofenusa* compared to normal foliage in the crowns of mature trees, and it may be that elm disease has temporarily favoured the local build-up of large populations of these sawflies.

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Many thanks to Dr E. Altenhofer (Groß Gerungs, Austria), Dr M. R. Shaw (NMS, Edinburgh), Dr D. R. Smith (United States Department of Agriculture, Washington, D.C.), L. Ficken and Dr M. Fitton (NHM, London) for information and the loan of material.

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ANNOUNCEMENT

HOMONEURA PATELLIFORMIS (BECKER, 1895) AND *H. THALHAMMERI* PAPP, 1979, THE ACTUAL SPECIES COMPRISING THE LAUXANIID TAXA HITHERTO KNOWN IN BRITAIN AS *H. CONSOBRINA* (ZETTERSTEDT, 1847)

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A wildlife survey carried out in Coventry during 1991 has produced many surprises within the Diptera, one of these being the particularly large number of sites obtained for the nationally scarce *Homoneura consobrina*. Whilst sorting this material, careful reference was made to papers by Papp (1979a,b) and Remm & Elberg (1979), which furnish descriptive accounts and/or critically important genitalia diagrams, both of which are conspicuously lacking in the British literature, notably Collin (1948). The European lauxaniid fauna is considerably larger than ours, with many extra species that are only confidently separable on genitalia characters. It became apparent that the '*consobrina*' material contained good series of males with two entirely different genitalia types, each from several sites. Reference to the genitalia figures in Papp (1979b) quickly provided a clue to their identity. One series corresponded exactly to *H. thalhammeri* (Fig. 1), the other equally well to *H. patelliformis* (Fig. 2). It is fortunate that the male genitalia of these *Homoneura* species are large (approximately half the length of the abdomen) and exhibit many useful characters externally without the need for full dissection. Reference to the key in Papp (1979b) and the type description of *H. thalhammeri* in his 1978 paper confirmed these identifications. According to Papp's key, the true *H. consobrina* has a dorsocentral configuration consisting of one pair of presuturals and two pairs of postsuturals. Both *H. thalhammeri* and *H. patelliformis* have all three pairs of dorsocentrals placed behind the suture as does all other British '*consobrina*' material I have seen. It would thus appear that the concept of *H. consobrina* used by Collin (1948) was not the same as that of European workers, but rather one or both of the species dealt with here. *H. consobrina* is thus best struck off the British list.

Within Papp's 1979(b) key, all three species combine to form an easily recognized group of rather small, completely clear-winged species normally with six rows of equal-length acrostichals. It should be stated at this point that the recently described *H. hospes* Allen (1989) does not appear to belong to this group, though it too has clear wings and a pair of presutural dorsocentrals like *H. consobrina* (but three rather than two postsutural ones and a different acrostichal arrangement). Additional means of separating *H. patelliformis* and *H. thalhammeri* can be found in the shape of the head capsule. In the former species, the face and frons are comparatively broad, the dark occipital mark above the neck usually slightly wider, and the jowls wider (about a third of the eye height), producing a 'taller' head profile (Fig. 4). The jowls of *H. thalhammeri* are about one-fifth of the eye height (Fig. 3). In Coventry material of *H. patelliformis* the hind femur usually has two to four clearly differentiated (though not especially strong) anteroventral bristles at the tip, these typically being represented by undifferentiated short hairs in *H. thalhammeri*, though reliability of this character has been queried in non-Coventry specimens (A. E. Stubbs, pers. comm.). The head characters seem to work equally well in both sexes. Unfortunately, like so many lauxaniids, the head capsule has a frequent habit of collapsing during drying, so exposing the genitalia of male specimens during pinning is strongly recommended.

Outside of Europe, related species include *H. patella* and *H. spinidorsum* both described and figured by Shewell (1971) from Mongolia, and an undescribed

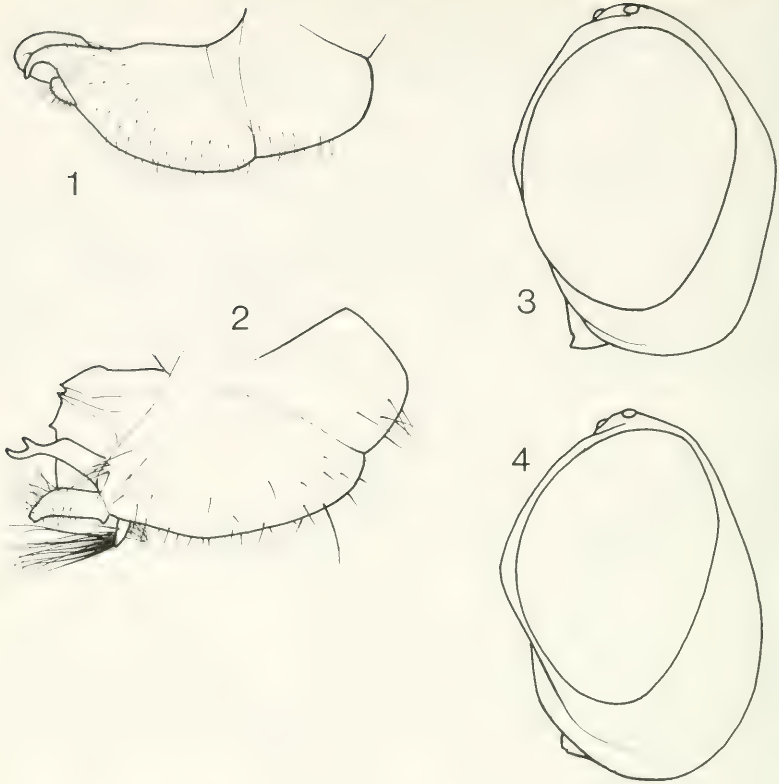

Fig. 1. Male genitalia of *Homoneura thalhammeri*. Fig. 2. Male genitalia of *H. patelliformis*. Fig. 3. Head profile of *H. thalhammeri*. Fig. 4. Head profile of *H. patelliformis*.

species near *patella* from Israel (Freidberg & Yarom, 1990). *H. patella*, which was considered conspecific with *H. patelliformis* by Remm & Elberg (1980), varies in details of the male genitalia. It lacks the bifurcate hypandrial appendage and has much larger cerci. The jowls are wider, about two-fifths the eye height. *H. spinidorsum* has genitalia resembling *H. thalhammeri* but with obviously larger cerci and aedeagus. It also has fairly narrow jowls (one-quarter of the eye height) but only four rows of acrostichals.

These flies are most frequently encountered by sweeping scrub, isolated shrubs, trees and adjacent tall herbage or coarse grasses, and with practice can be distinguished from other orange-bodied lauxaniids by a combination of colour, size and shape. In my experience, a particular fondness is shown for *Salix* species, especially sallows, though one Coventry record of *H. patelliformis* was from beneath an isolated weeping willow *Salix babylonica* L. and I have taken both species away from sallow. Both species will utilize dry and marshy locations and are clearly not confined to either high quality or older habitat. I am unable to detect any obvious differences in their

habitat requirements, and they were recorded together at five Coventry sites which suggests that their ecology is probably very similar. Mr D. Smith (pers. comm.) informs me that he has found *H. patelliformis* around garden compost heaps and in numbers on the flowers of balm *Melissa officinalis* L.

Abroad, *H. patelliformis* is recorded from Austria, 'Czechoslovakia', Hungary, 'Yugoslavia', Bulgaria, Italy, Southern 'European Russia' (all Papp, 1984a), Rumania (Papp, 1984b), Israel (Friedberg & Yarom, 1990) and Mongolia (Shewell, 1971). *H. thalhammeri* is relatively poorly known, with records apparently restricted to 'Czechoslovakia', Hungary and Rumania (Papp, 1984a).

Locality data (S. J. Falk records unless stated)

H. thalhammeri. W. Cornw.: Beagle Bay (SW7616) 16.vi.77 (vegetation near rocky shore), A. Irwin (specimen in Norwich Museum, det. S.J.F.). N. Devon: Braunton Burrows NNR (SS4534) 20.vi.87 (large calcareous dune system with scrub). Berks.: Thatcham 15.vii.70 (valley fen and canalside), A. E. Stubbs. Cambs.: Kirtling 16.vi.21, 14.vi.25, J. E. Collin (specimens in Oxford Univ. Museum, det. J. W. Ismay). Oxon.: Apsley Rd, Oxford, 4.viii.77, G. C. Varley (specimens in Oxford Univ. Museum, det. J. W. Ismay). W. Norf.: Brancaster 'Marsh Side' (TF7744) 8.vii.93 (swept from shrubs beside saltmarsh). Hunts.: Fenstanton, Brampton, J. Cole (post-1970). Warks. (all but Sutton Park within Coventry City boundary): Herald Way Marsh (SP3776) 10.vii.90, 12.viii.91 (urban derelict grassland, tall herb, scrub and marsh); R. Sowe, Willenhall (SP354762) 27.vii.91 (numerous on riverside sallow); Baginton Fields (SP358758) 21.vii.91 (grassland, tall herb and scrub); Eastern Green Brook (SP275797–307795) 3.ix.91 (streamside scrub, tall herb and grassland); Keresley (SP320839) 26.vi.93 (sycamore and hawthorn scrub); Lower Stoke (SP348784) 17.viii.93 (common on sallows along disused railway line); Almond Tree Avenue Pond (SP358828) 17.vii.91 (common on pondside scrub); Stoneywood Road Pond (SP377818) 9.viii.91 (common on pondside sallow); Hearsall Common (SP311785) 10.vii.91 (swept from scrub); Sutton Park (SP0995), J. Cole (post-1970). N. W. Yorks.: Malham Tarn (SD8966) 26.viii.84 (swept off sycamore tree), A. Irwin (specimen in Norwich Museum, det. L. Papp). Pembs.: Skokholm vii.1934, F. W. Edwards; vi.1950, K. G. V. Smith (both in BM(NH)—det. N. Wyatt).

H. patelliformis. W. Kent: Bromley 12.vi.71 (in garden), P. J. Chandler; Blackheath and Charlton vi–vii.1962, A. A. Allen; Darenth Wood (TQ5772) 27.v.87 (in ancient woodland), A. Godfrey. Bucks.: Aston Rowant NNR, 15.vi.90, P. J. Chandler. Berks.: Maidenhead, in "Insectocutor" tray of Western Research Laboratories, 6.vi.92, P. J. Chandler. S. Essex (all D. Smith): Harold Hill (TQ5392) 20.vii.79 (water trap in garden); Dagnam Park vii–ix.1976–80 (inc. swept from pond); Laindon (TQ6888) vii–viii.1979; Basildon (TQ7489) 8.v–ix.ix.88 (malaise trap). Herts.: Potters Bar 27.vii.64, J. Deeming (in BM(NH)—det. N. Wyatt). Hunts.: Warboys, J. Cole (post-1970). Northants.: Ferry Meadows, Peterborough (TL52984) 6.vii.86. Warks. (all within Coventry City Boundary): Herald Way Marsh 10.vii.90; Whitley Common North (SP343775) i.vii.91 (common on sallow scrub): Eastern Green Brook (as per *H. thalhammeri*); Baginton Fields (as per *H. thalhammeri*); R. Sherbourne, Charterhouse (SP345780) 12.vi.91 (riverside tall herb and scrub); Newfield House (SP334805) 10.vii.91 (scrub and tall herb); Banner Lane Fields (SP277785) 2.vii.91 (swept from hedgerow); Wyken Croft Park (SP377807) 15.viii.91 (riverside scrub); Keresley (SP320839) 24.vi.93 (industrial derelict ground with scrub); Craven Colliery (SP373814) 8.viii.91 (scrub and tall herb); Hearsall Common (as per *H. thalhammeri*); R. Sowe, near Henley Farm (SP366810) (swept from beneath a weeping willow).

Acknowledgements

I am very grateful to A. A. Allen, P. J. Chandler, J. Cole, A. Godfrey, A. Irwin, J. Ismay, D. Smith, A. E. Stubbs and N. Wyatt for responding to my requests for site-related data on these species. Additional thanks are due to A. Godfrey for providing me with copies of much of the foreign literature necessary for this work and for checking the manuscript.

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LETTER TO THE EDITOR

Habitat management for invertebrates.—We were pleased to see the review of the handbook *Habitat management for invertebrates* that you have written for the *British Journal of Entomology and Natural History* (1993; **6**: 93). This handbook has been very well received and we were delighted that you have reviewed it so favourably.

However, we are concerned at the suggestion that chapters should be photocopied for attaching to reports, as this constitutes a breach of copyright. The handbook was published by ourselves, and produced jointly with Joint Nature Conservation Committee. They hold the copyright, and anyone wishing to reproduce parts of the book should contact them for permission at Monkstone House, City Road, Peterborough PE1 1JY.

The book has been deliberately priced as low as possible, and is available at £11.50 (inc. p. & p.) from RSPB, The Lodge, Sandy, Beds. SG19 2DL. Profits from sales will go to invertebrate conservation.—Sarah Niemann, Advisory Officer, RSPB, Sandy, Bedfordshire.

HOMONEURA SUBNOTATA PAPP, 1979 (DIPTERA: LAUXANIIDAE) NEW TO BRITAIN AND THE DELETION OF *H. NOTATA* FROM THE BRITISH LIST

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Whilst identifying Diptera from Jersey collected by Walter Le Quesne, I came across a specimen that keyed out to *H. notata* using the standard work of Collin (1948). On checking the identification using the more recent key of Papp (1979), who has revised the species allied to *notata*, the specimen keyed out to *H. subnotata* Papp. Subsequent checking of British material has confirmed the misidentification of *H. notata* for *H. subnotata*. *H. notata* was not found in checking British collections and it is therefore proposed that it is removed from the British list.

The two species can easily be separated on the extent of anteroventral bristles on the hind femora. In *H. notata* these extend the length of the femora (Fig. 1), whereas in *H. subnotata* they are restricted to the middle part (Fig. 2). Differences in the male genitalia are described and illustrated by Papp (1979).

In sorting out the confusion that exists in the group, use was made of specimens in the Natural History Museum, London. Specimens of *H. notata* were found to comprise *H. subnotata* and a third number of the group *H. maghrebi* as well as *H. notata*. These have been correctly labelled and the records given here. Some of these are new country records. In addition I have added additional Continental records of species referred to or communicated to me.

H. subnotata is known from France, East Germany, Hungary, Bulgaria, Italy and Czechoslovakia. Oelerich (1988) recently recorded *H. subnotata* from the Friesian island of Memmert off the German/Dutch coast. Remm & Elberg's (1979) figures of male *notata* (figures 7a and 7b) are, in fact, of *subnotata*. Specimens in Remm & Elberg's paper are without data, although they were collected in Latvia, Lithuania and Estonia. It is therefore likely that the records of *H. notata* in Remm's other papers (for example Remm, 1972) refer to *subnotata*.

Records available to me of *H. subnotata* are as follows. Abbreviations: PJC, Peter J. Chandler; FWE, F. W. Edwards; SJF, Steven J. Falk; Hope, Hope Department, Oxford; NHML, Natural History Museum London; IP, Ivan Perry; WLQ, Walter Le Quesne; PS, Peter Skidmore; PW, Phil Withers; CY, Colonel Yerbury.

England. Cambs.: two males, Chippenham Fen NNR 52/645693 15.vii.1979 (IP). Cornwall: two males, Penzance 8.vii.1921 (Hope); one male (and associated female)

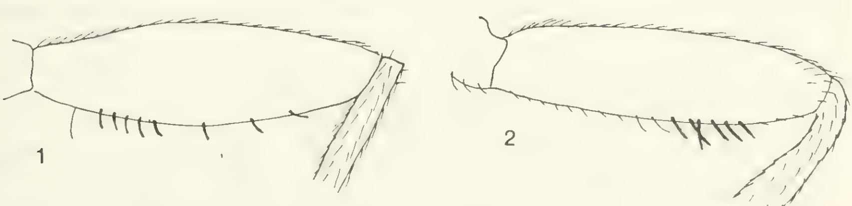

Fig. 1 & 2. Hind femora, anterior view. 1: *Homoneura notata*; 2: *H. subnotata*.

from coastal scrub, Porthluney Beach 7.vii.1983 (PJC). Devon: two males swept from fixed calcareous mid-dune grassland, Braunton Burrows 13.vi.1989 and 15.vi.1989 (SJF). Somerset: one male (and associated female), Shapwick Heath ST43 5.vii.1985 (PJC). Suffolk: three males, Barton Mills 19.vi.1930 (Hope).

Wales. Gwynedd: Dolgarrog Marsh (mainly *Phragmites* fen), 2.viii.1969 (PS). Mid-Glamorgan: one male, Porthcawl (=Kenfig) 18.vi.1903 (CY—Hope).

Channel Islands. Jersey: white poplar, La Moye 5.v.1988 (WLQ).

Spain. Two males, Soria, near Tena, by River Zarranzano 20 G, 1980. Santander, Ulda, 24.x.1978 on *Acer* leaf by wooded stream (PJC).

France. One male, Bouches-du-Rhone by lake north of Salin-de-Giraud, 31.v.1971 (PJC); two males River Brevenne, Rhone Alpes 6.v.1991 (PW).

Lithuania. Two males, Nidden 18.viii.1933 (FWE) confused under *notata* in the NHML.

H. notata is recorded from Sweden, Finland, West and East Germany, Austria, Hungary, Yugoslavia, Romania, Italy, France, Poland, Czechoslovakia, Bulgaria, Latvia, Lithuania, Estonia, Ukraine and Russia, although some of these will need confirming. The Latvian, Lithuanian and Estonian records are probably incorrect for the reason given above under *H. subnotata*. Peter Chandler has collected *H. notata* from France (Deux Sevres). I can add an additional record from the NHM.

Slovenia. One male Pastojna, wooded hill north-west of village 13.vi–1.viii.1958.

H. maghrebi Papp is recorded from Algeria and Tunisia. It is similar to the two species above, but differs in the male genitalia and bristle arrangement on the hind femora (similar to *subnotata*, comprising about four closely-situated stout bristles beyond the mid-point of posteroventral surface). I can add new records from Cyprus.

Cyprus. One male (and associated female) on fig tree, Famagusta 10.vi.1930 (Th. Stuakides); two males, Krios R., Kilani 15.ix.1937 (G. A. Mavromoustakis); one male, Gala (J) a, Cyprus 12.vi.1956 (S. Pieris).

A fourth species in the *notata* group; *H. tunisica* was described by Papp, but not seen in this study.

Acknowledgements

My thanks to Laszlo Papp and Evi Remm for advice and offprints and to the entomologists named above for supplying me with specimens or for checking their collections.

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THE MODIFIED STATUS OF *STRYMONIDIA W-ALBUM* (KNOCH) (LEPIDOPTERA: LYCAENIDAE) IN NORTH WEST SURREY

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Historically, *Strymonidia w-album* (Knoch), the white letter hairstreak, has been regarded as a rare insect in north west Surrey. Bretherton's (1955) comprehensive list for the area cites but one record in 1864. This author advised two further sightings, in 1970 and 1972 (Baker, 1986). Thereafter, spread of Dutch elm disease, which killed all known wych elm *Ulmus glabra* Hudson in the area, made further records even more unlikely.

This situation changed in 1992 when, over the period 27.vi to 4.viii, four sightings of this hairstreak were made in my garden in the Thorpe/Virginia Water area. The condition of the insects seen indicated that at least three specimens were involved.

This year, 1993, a check of roadsides and hedgerows was made from late April to early June. One 200 m length of a somewhat remote lane which contained a single fruiting example of *U. glabra* in the mid 1980s (which had disappeared by 1989), produced six straggly examples in 1993, and two other more substantial trees were found in hedgerows, isolated from these by about 3 km. Three larvae of *S. w-album* were found on the six adjacent trees and none on the isolated specimens.

It has been reported previously that, when the M25/M3 motorway system was built and nearby roads realigned, large scale amenity planting of exotic tree species took place along the newly created banks and verges. One such bank was found some 1 km from my house and about 3 km from the site mentioned above. Over about 200 m, 50–60 examples of an exotic 'wych elm' are included in a dense planting of several other species along both sides of the roadway. These *Ulmus* specimens are 5 to 10 m tall and they fruited freely in 1993. This *Ulmus* has reddish winged fruits scattered along the branches in bunches of up to about six—compared with *U. glabra* which has large aggregations of pale green fruits generally towards the ends of branches. These trees produced larvae of *S. w-album* in quantity. A systematic check of three neighbouring trees, covering all that could be reached from ground level up to 2.5 m along one side produced 14 larvae, suggesting that a very substantial colony is present.

All larvae fed up quickly, showing a marked preference for leaves rather than fruits, and over 50 butterflies were ultimately returned to the wild.

One, rare, sunny afternoon in late June showed the white letter hairstreak to be flying in some numbers around the trees and feeding freely from roadside thistles and early *Buddleia*. In previous years I have regularly walked this road without seeing this butterfly.

This dramatic upsurge in the population of what has been regarded as a scarce—or overlooked—insect prompts several questions.

Past experience with the rearing of wild caught *S. w-album* larvae from other parts of Surrey has shown their marked preference for the fruits and they would only consume the leaves of their foodplant when no alternative was available. The non-preferred diet would result in slightly undersized specimens unless the larvae were taken a short time before pupation. The noted preference for leaves over fruit on the part of the present population may be the result of selective pressures which have allowed a relict population to survive over a period when mature,

fruiting wych elm was rare or exterminated in their habitat. Small suckers of *U. glabra* and other elms did survive Dutch elm disease and could have provided the conditions necessary to tide the species over until more favourable conditions ensued.

Or was the present population imported with the trees which were planted in the late 1970s, there to survive at low levels until conditions became favourable for the current population explosion? Two adult specimens retained show no obvious difference to other Surrey examples, but detailed examination by a butterfly expert might detect differences which suggest an origin from elsewhere in the UK or perhaps overseas.

The advantage that *S. w-album* has received from motorway construction may be quoted by the proponents of such works to show that such excrescences can be beneficial to wildlife. Whatever the utility of our road system this event must surely be viewed in the same 'positive' light as the fact that *Thalera fimbrialis* (Scop.) has seemed to benefit from the protection afforded by the fence which surrounds the Nuclear Electric complex at Dungeness.

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SHORT COMMUNICATION

***Ctenophora flaveolata* (F.) (Diptera: Tipulidae) from The Warburg Reserve, Oxon.**—Whilst on an evening visit on 13.iv.1993 to The Warburg Reserve SSSI (formerly known as Bix Bottom), Oxon (grid reference SU7187) I took a male of this impressive species from a beech trunk. The specimen was reluctantly taken, since its rarity was predicted, but fading light meant that photography was not possible. The species is currently given Red Data Book 2 status in Falk (1991), and is associated with ancient beech woodlands in Southern England. This specimen was taken in an area of the reserve dominated by mature beech. A map of its national distribution and brief notes on its ecology and status were recently published by Stubbs (1992) and a recent record was also given by Alexander (1991). Despite its rarity, the species has been recorded on three other occasions in Oxon (J. Campbell, pers. comm.). The record is particularly interesting because of the very early date; the species is normally recorded in May.

My thanks to BBONT for permission to collect insects on their reserves, Miss Tina Teearu for organizing the visit and John Campbell, Oxfordshire Museums Service, for checking the records in his care.—A. Godfrey, Ecosurveys Ltd, Priory Lodge, Hagnaby, Spilsby, Lincolnshire PE23 4BP.

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BENHS FIELD MEETING

Richmond Park, Surrey, 3 July 1993

Leaders: **Mark Parsons** and **Graham A. Collins**. Disappointingly, only three members attended the afternoon session of this field meeting. This low number could not have been due to the weather which was sunny and warm. The three of us worked along the western edge of the park, from the general vicinity of Pembroke Lodge to Ham Gate, and we were fortunate to see several interesting species. The scarce jewel beetle *Agrilus pannonicus* (Pill. & Mitt.) proved to be not uncommon and was seen at rest on the old oaks and in flight. Exit holes of this species were also pointed out on the old oaks by one of the members attending. Another scarce jewel beetle, *Agrilus sinuatus* (Ol.), was found later in the afternoon, this beaten from an old hawthorn. Two suspected *Ampedus cardinalis* (Schiödte) were seen about the oaks, these were both very flighty and neither was retained for positive identification. Its less scarce relative, *Ampedus balteatus* (L.), was found in some numbers.

Of the Lepidoptera, perhaps the most interesting observation was the finding of a number of yellow-legged clearwing, *Synanthedon vespiformis* (L.), flying around cankerous growth on several of the old oaks. Although entomologists usually associate this species with cut stumps, the cankerous growth (and possibly also wounds) is presumably the sort of situation that this clearwing would more typically exploit. The scare micro-moth, *Dystebenna stephensi* (Staint.), was also observed later in the afternoon, both at rest on the trunks of, and flying around the oaks. A few butterfly species were seen, the most pleasing being good numbers of the purple hairstreak, *Quercusia quercus* (L.).

A species for which Richmond Park is well known in the London area, the hornet, *Vespa crabro* L., was eventually seen, and later several examples were attracted to the light traps. Five species of Odonata were also recorded. Although poorly attended, this proved to be an enjoyable and entomologically a very rewarding afternoon.

The evening meeting was slightly better attended, with five members, and seven light traps were run around the Isabella Plantation. The aim was to try to discover whether the moths *Dicycla oo* (L.) (heart moth) and *Mythimna turca* (L.) (double-line) were still to be found in an area once famous for them. Very encouragingly the first moth to appear at sugar was *turca* and by the end of the evening no less than fifty examples had been noted. As there had been records of only three individuals from Surrey in the last 20 years, this rediscovery is very significant, especially as this would be one of the last surviving colonies in the east of England. Our other quarry, *oo*, was not found despite the fact that two of us stayed until after 1.30 a.m. and examples had been seen the previous evening at another well known site less than 20 miles distant. Overall some 60 species of macro-moth were noted at light and sugar, the most interesting of which were: *Hepialus hecta* (L.) (gold swift), *Eupithecia subumbrata* (D. & S.) (shaded pug), and *Xestia ditrapezium* (D. & S.) (triple-spotted clay).

An example of the scarce beetle *Phloiotyra vaudoueri* (Mul.) was found on a dead oak branch.

We would like to thank the Deputy Superintendent of Richmond Park for granting access permission to a very worthwhile site.

BENHS INDOOR MEETINGS

8 June 1993

The President, Dr D. LONSDALE, announced the death of Mr M. Tweedie.

Dr I. MCLEAN showed a live specimen of the carabid beetle *Panagaeus bipustulatus* (F.) found by his 4-year-old daughter at Roydon Common, Norfolk, during the field meeting held on 5.vi.93. This scarce beetle occurs on coastal dunes and other dry or sandy habitats.

Mr A. J. HALSTEAD showed a live female giant wood wasp *Urocerus gigas* (L.) (Siricidae) collected on 7.vi.93 at the RHS Garden, Wisley, Surrey. The wood wasp was seen flying up and down a flower bed that had been recently mulched with chipped conifer bark. This insect lays eggs in the branches or trunks of dead or dying conifers and may have been attracted by the smell of the bark mulch.

The names of Graham Hopkins, Martin Harvey, Ian Frank Smith and Christopher Mulvey were read for the second time and they were duly elected as members.

Mr M. SIMMONS reported that he had found the local hoverfly *Brachypalpoides lenta* (Meig.) in his greenhouse at Crowborough, Sussex.

Mr N. A. CALLOW said that on the 6 and 7.vi.93 he had seen wasp beetles, *Clytus arietis* (L.) in a house at East Harptree, Avon. They had presumably emerged from firewood brought into the house. The President commented that log piles attract dead wood insects which are destroyed if the logs are later used for firewood.

Mrs F. MURPHY noted that the date given in the London Natural History Society's newsletter for the BENHS meeting on dragonflies was incorrect.

Dr W. FOSTER spoke on soldier aphids. Aphids are generally thought of as rather placid insects but there are some species that have developed the ability to fight back against would-be predators. This behaviour is found amongst 25 aphid species that have developed as social insects with a sterile soldier cast. The existence of soldier aphids is a comparatively recent discovery, following the description in 1977 by the Japanese entomologist Shigeyuki Aoki of a *Pseudoregma* sp. feeding on bamboo. In this aphid the soldiers are heavily sclerotized first-instar nymphs that never develop any further. They have a pair of prong-like horns on their heads which are pushed into the bodies of predators. Some British aphids, such as *Pemphigus spirothecae* Passerini, which causes spiral galls on the petioles of poplar leaves, have a social organization. Their soldiers have toughened hind legs which they use to squeeze predators while piercing them with their stylets. The soldiers also use their heads to push wax-coated honeydew droplets out of the gall. Without this assistance the other aphids in the gall would eventually drown in their own excrement. Experiments with galls containing various ratios of soldiers and non-soldiers show that the survival of *Anthocoris minki* Dohrn nymphs and coccinellid larvae decreases as the number of soldiers increases. Soldiers can prevent predators from entering galls by guarding the entrance.

The speaker described some non-British soldier aphids. In Malaysia an *Astegopteryx* sp. causes star-shaped galls on *Styrax* trees. This aphid migrates to bamboo, where dense colonies of aphids form on the stems, with the soldiers positioned around the edges of the colonies. In a north American desert species the fundatrix produces offspring which are all soldiers during the dry season, but which subsequently develop normally and migrate to the alternative host plant with the onset of the rainy season.

Social behaviour in aphids has developed in relatively few species. It seems to be linked with gall formation, possibly because the gall provides a defendable structure.

Defensive actions may have evolved from gall cleaning functions. Not all *Pemphigus* spp. have soldiers and this trait seems to be linked with species that occupy galls for a long period, e.g. *P. spirothecae*, which lives in its galls all summer, but not *P. bursarius* (L.) the gall stage of which is limited to the spring.

14 July 1993

The President, Dr D LONSDALE, in the chair, welcomed members of the British Dragonfly Society to the meeting.

The deaths were announced of Mr W. G. Vosper, Mr P. W. Brown and Mr C. S. H. Blathwayt.

Mr S. MILES made available an information sheet on the Joint Committee for the Conservation of British Invertebrates and a report by the Wildlife Link representative. He reported that the JCCBI needed a volunteer to help with secretarial work.

Mr B. Ashby gave details of the London Natural History Society's new publication *The larger moths of the London area* by Colin Plant. This gives details of the occurrence and distribution of the 718 species of macrolepidoptera recorded within 20 miles of St Paul's Cathedral. The price is currently £14.95, including postage and packing; in 1994 the price will go up to £19.95. Orders should be sent to LNHS Publications, 3 Chatsworth Gardens, West Harrow, Middlesex, HA2 0RS.

Mr STEVEN BROOKS spoke on the ecology of the downy emerald dragonfly, *Cordulia aenea* (L.). This species has become much more local in the London area than in former years. It is now restricted to some of the ponds in Epping Forest, Burnham Beeches Forest and at Esher and Epsom Commons. Although of widespread occurrence in northern Europe, it has a patchy distribution in Britain, being found in the south-east and central southern England, with scattered records up the west coast to Scotland. Studies were carried out to elucidate this species' habitat and management requirements. The main study site was at Wake Valley Pond in Epping Forest. This has clean water with a good variety of vegetation in and around the pond, and 18 species of Odonata have been recorded there.

The downy emerald breeds in woodland pools, usually with acidic water, although some of the pools at Epping have a pH of up to 7.8. The nymphs live on the bottom of ponds and are aggregated in areas with accumulations of tree leaf litter but outside areas that are heavily shaded by trees. The nymphal stage takes two years to complete and so this species is dependent on pools that retain water throughout the year. The adults emerge about mid-May and emergence is usually completed within a two-week period. They emerge between mid-morning and the afternoon, whereas most dragonflies emerge overnight or in the early morning. More nymphs were found to emerge on the shady side of the pool and the emergence points were more widespread than the distribution of immature nymphs. Various supports are used by the emerging nymphs, some of them climbing up into trees.

The adults mature rapidly and egg laying may commence within 4–5 days. The feeding and roosting sites of sexually immature adults are unknown. Marking experiments with adults were carried out by putting coloured paints onto the wings. In 1992 150 males were marked but only nine were later seen. The males do not spend long at the pond or feed there, but are mostly up in the tree tops. When looking for mates the males avoid shaded areas. Females fly low over the water with males patrolling at a height of about 5 feet, mainly over areas of open water. Copulation takes place in the tree tops and lasts for more than an hour. Ovipositing females avoid parts of ponds that are shaded or full of vegetation. The preferred egg-laying sites are in shallow water

with sparse emergent vegetation. Under laboratory conditions eggs hatch after 13–17 days.

The habitat requirements of the downy emerald include access to permanent ponds with clean water. Accumulations of slow-to-decay deciduous tree leaves on the pond bottom are required by the nymphs. Trees are needed near the pond by the adults for feeding, roosting and mating purposes. The tree cover should not, however, be too dense in order to avoid excessive shading of the pond.

14 September 1993
Joint Meeting with the London Natural History Society, Burlington House, Piccadilly

Ms RUTH DAY, President of the LNHS, was in the chair.

Mr A. J. HALSTEAD showed three exhibits of live invertebrates. These were: adults of *Glischrochilus hortensis* (Fourc.) (Coleoptera: Nitidulidae) found feeding on rotting onion bulbs in a garden at Great Ashfield, near Ipswich, Suffolk, on 5.ix.93; silk tubes containing larvae of the green wax moth, *Aphomia sociella* (L.) (Lepidoptera: Pyralidae) found 7.ix.93 in a garden shed at New Malden, Surrey; a millipede *Polyxenus lagurus* (L.) (Polyxenida: Polyxenidae) found 31.viii.93 under loose bark on an old hawthorn tree in a garden at Maidenhead, Berks. This small millipede bears a superficial resemblance to the larvae of certain dermestid beetles, which might also be found in this situation.

Mr R. HAWKINS showed a specimen of the mirid bug *Pantilius tunicatus* (F.) (Hemiptera: Miridae). It was beaten from alder as a final instar nymph on 10.ix.93 at Llangloffan Mire near Mathry, Pembs. This is a first record for the county although it appears to be widespread as nymphs were also found at two other sites. *P. tunicatus* lays eggs in middle to late September but they do not hatch until the following August. The nymphs feed on the unripe male catkins of certain deciduous trees. It is probably under-recorded as it is only active late in the collecting season.

Mr R. UFFEN showed a small hornet's nest found at Walkern, Herts. It had been removed from a bird's nest box on 8.viii.93 after it had been treated with an insecticide. The nest consisted of two combs of 89 and 14 cells respectively. The queen was not found but there were some worker hornets and fly puparia. From the latter emerged four adults of *Muscina pabulorum* (Fallén) (Diptera: Muscidae) on 13.ix.93. There did not appear to be enough debris in the nest to support the larvae of these flies and it is possible that they may have been feeding on hornet larvae.

Mr R. A. JONES showed some examples of the rhododendron lacebug *Stephanitis rhododendri* Horvath (Hemiptera: Tingidae) found in the Rhododendron Garden at Dulwich Park, London SW21, during July–September 1993. This species was first recorded in Britain in 1901 but although at one time it was a significant pest it has become very scarce in recent years.

Mr C. B. ASHBY drew attention to the recently published LNHS book *Larger moths of the London area* by Colin Plant.

Mr R. UFFEN said that he was recorder for bees, wasps and sawflies in Hertfordshire and Middlesex. He would like to receive records and/or specimens from those counties. Collections made in gardens are of particular interest, since some species found there seem to be uncommon in the open countryside.

The names of David Scott Hackett, Erich Hoyt, Ian Richard Hudson, Howard John Mousley, Dr Sandrine A. Ulenberg and Kenneth William Winfield were read for the second time and these persons were duly elected as members.

Mr P. Pearce-Kelly spoke on the work of the Invertebrate Conservation Centre at London Zoo. London Zoo led the world in 1881 when it became the first zoo to display insects. The present invertebrate house was built in 1912 and has now become somewhat dilapidated. In recent years the displays have become more habitat-orientated with the animals being shown in more natural surroundings. About 80 types of insects, spiders and other invertebrates are on display, but at the moment much of the conservation work is not on view to the visiting public.

Over the years much experience has been gained at the zoo in breeding and rearing invertebrates in order to maintain stocks for display purposes. This knowledge is now being used to help with the conservation of species under threat in the wild. Some species of tarantula spider have become popular as pets and are in danger of being over-collected. Captive breeding relieves this pressure and the knowledge gained from breeding popular pet species, such as the Mexican red-kneed bird-eating spider, can be used as a model for other species.

In French Polynesia *Partula* spp. snails have been studied as an example of speciation on islands. Over 100 species have been described in this genus. They became threatened with extinction when a predatory snail, *Euglandina*, was introduced to try and control another non-indigenous species, the African land snail. London Zoo, along with other institutions around the world, is maintaining colonies of 29 taxa with another 12 soon to be added. It is unlikely that *Euglandina* will be controlled but it is hoped that colonies of some of these captive-bred *Partula* snails will be returned for release in caged areas from which the predator has been excluded. One species is going to be introduced into a glasshouse at Kew Gardens so that studies on its dispersal can be made.

The field cricket in Britain has declined to one site in Sussex. This is one of the species being targeted by English Nature's species recovery programme. Before releases can be made at additional suitable sites it is necessary to build up stocks. Six males and females were collected and from these about 1000 nymphs were bred. During 1992 750 older nymphs were released at two sites. Further releases were made during 1993 and four of the intended six sites have now had nymphs released. Research into the field cricket's biology has been carried out during the breeding programme. Similar techniques are being used to assist the survival of the wart biter cricket. Other projects are being undertaken with endangered New Zealand crickets and an Italian ground beetle, *Carabus olympii*, which in the wild is confined to a single valley in the Italian Alps. London Zoo is investigating the invertebrate fauna of St Helena, which has at least 300 endemic species. One of these, the St Helena giant earwig (89 mm long) has not been found since the 1960s. It may have become extinct but searches continue in suitable habitat areas.

Computer programmes, based on the *Partula* snails breeding programme, have been developed that will help with the management of other types of invertebrate breeding stock.

Mr Pearce-Kelly closed his talk by showing some artist's drawings of the proposed new invertebrate house which will be on the site of the old parrot house. This larger area will allow space in which the conservation work can be displayed. Mr Pearce-Kelly brought to the meeting live examples of some of the endangered invertebrates currently being bred at London Zoo.

Special Meeting

After the ordinary meeting closed, at 8.30 p.m., members of the BENHS were asked to remain in the lecture hall so that a Special Meeting of the Society could take place

to consider a revision of the bye-laws. The Society's Vice-President, Dr J. Muggleton took the chair.

Dr Muggleton showed the meeting the draft copy of the Society's proposed new bye-laws, compiled by the Treasurer, Mr A. J. Pickles. Copies of this draft had earlier been circulated to all members of the Society. The need for new bye-laws was explained and hinged on three major factors—changes in the law relating to charities, the Society's acquisition of the building at Dinton Pastures, and concern over the time it had taken for prospective members to join the Society.

A postal ballot was required under the Society's existing bye-laws, and in order that this could take place, no amendments to the proposal of adoption of the bye-laws could take place at this Special Meeting. However, the views of the audience were invited to be aired. Should changes be thought necessary, these could be tabled for another Special Meeting in the near future.

Mr R. Uffen asked Mr Pickles to explain the new Charities Act. Mr Pickles explained how the Charities Act, 1992, affected the running of the Society and how this was reflected in the new wording of the bye-laws. For instance, the new act made all members of the Council 'Trustees' in the eyes of the law.

Mr R. Hawkins asked why the Society should need to take powers to employ people and why it should need to insure Council members against liability. Mr Pickles explained that the Society had to take specific powers to run its activities, and consider future possibilities also.

The motion was then put to the meeting, proposed by Dr Muggleton: Do you agree with the revised edition of the bye-laws, yes or no? The motion was seconded by Mr Uffen. The meeting ballot was 13 in favour, 0 against. The result of the postal ballot was 62 in favour, 1 against. The motion was carried and the new bye-laws were adopted by the Society. The meeting closed at 8.55 p.m.

SHORT COMMUNICATIONS

A colour variety of *Oedemera lurida* (Marsh.) (Coleoptera: Oedemeridae).—On 25.viii.1993, I swept two specimens of *Oedemera lurida* from a ride edge in Tunstall Forest, Suffolk. One was the normal dark sage green colour, the other had one elytron mainly dark purple-blue from a distinct line about one-eighth from the base to the apex. The metallic green of *Oedemera* and many other beetles is a 'structural' colour, an artefact of submicroscopic shagreenation causing refraction of particular light wavelengths. One must suppose that some chemical and/or physiological effect has interfered with the frequency of the shagreen, and hence with the resulting colour.—R. A. Jones, 13 Bellwood Road, Nunhead, London SE15 3DE.

***Chloroclysta siterata* (Hufn.) in north west Surrey.**—On 27.ix.1993 I had the first record for *Cloroclysta siterata* (Hufn.), the red-green carpet, for my garden in Thorpe/Virginia Water. A further five examples, all males, were noted up to the middle of October.

I know of no previous records for this insect in this area or in the nearby Windsor Forest complex, where extensive recording has taken place over the past 25 years.

Mr Graham Collins (pers. comm.) advises me that this moth has spread northward across Surrey over the past 2 years. Other records would be of interest to determine the degree and permanence of the range extension of this insect.—Peter Baker, Mount Vale, The Drive, Virginia Water, Surrey GU25 4BP.

1872–4	J. R. Wellman (dec.)
1875–6	A. B. Farn, F.E.S. (dec.)
1877	J. P. Barrett, F.E.S. (dec.)
1878	J. T. Williams (dec)
1879	R. Standen F.E.S. (dec.)
1880	A. Ficklin (dec.)
1881	V. R. Perkins, F.E.S. (dec.)
1882	T. R. Billups, F.E.S. (dec.)
1883	J. R. Wellman (dec.)
1884	W. West, L.D.S. (dec.)
1885	R. South, F.E.S. (dec.)
1886–7	R. Adkin, F.E.S. (dec.)
1888–9	T. R. Billups, F.E.S. (dec.)
1890	J. T. Carrington, F.L.S. (dec.)
1891	W. H. Tugwell, PH.C. (dec.)
1892	C. G. Barrett, F.E.S. (dec.)
1893	J. J. Weir, F.L.S., etc. (dec.)
1894	E. Step, F.L.S. (dec.)
1895	T. W. Hall, F.E.S. (dec.)
1896	R. South, F.E.S. (dec.)
1897	R. Adkin, F.E.S. (dec.)
1898	J. W. Tutt, F.E.S. (dec.)
1899	A. Harrison, F.L.S. (dec.)
1900	W. J. Lucas, B.A., F.E.S. (dec.)
1901	H. S. Fremlin, M.R.C.S., L.R.C.P., F.E.S. (dec.)
1902	F. Noad Clark (dec.)
1903	E. Step, F.L.S. (dec.)
1904	A. Sich, F.E.S. (dec.)
1905	H. Main, B.SC., F.E.S. (dec.)
1906–7	R. Adkin, F.E.S. (dec.)
1908–9	A. Sich, F.E.S. (dec.)
1910–1	W. J. Kaye, F.E.S. (dec.)
1912–3	A. E. Tonge, F.E.S. (dec.)
1914–5	B. H. Smith, B.A., F.E.S. (dec.)
1916–7	Hy. J. Turner, F.E.S. (dec.)
1918–9	Stanley Edwards, F.L.S., ETC. (dec.)
1920–1	K. G. Blair, B.SC., F.E.S. (dec.)
1922	E. J. Bunnett, M.A. (dec.)
1923–4	N. D. Riley, F.Z.S., F.E.S. (dec.)
1925–6	T. H. L. Grosvenor, F.E.S. (dec.)
1927–8	E. A. Cockayne, D.M., F.R.C.P., F.E.S. (dec.)
1929	H. W. Andrews, F.E.S. (dec.)
1930	F. B. Carr (dec.)
1930	C. N. Hawkins, F.E.S. (dec.)
1931	K. G. Blair, B.SC., F.Z.S., F.E.S. (dec.)
1932	T. H. L. Grosvenor, F.E.S. (dec.)
1933	C. G. M. De Worms, M.A., PH.D., A.I.C., F.R.E.S., M.B.O.U. (dec.)
1934	T. R. Eagles (dec.)
1935	E. E. Syms, F.R.E.S. (dec.)
1936	M. Niblett (dec.)
1937	F. J. Coulson (dec.)
1938	F. Stanley-Smith, F.R.E.S. (dec.)
1939	H. B. Williams, LL.D., F.R.E.S. (dec.)
1940	E. A. Cockayne, D.M., F.R.C.P., F.R.E.S. (dec.)

1941	F. D. Coote, F.R.E.S. (dec.)
1942	S. Wakely (dec.)
1943	R. J. Burton, L.D.S., R.C.S.ENG. (dec.)
1944	Stanley N. A. Jacobs, F.R.E.S. (dec.)
1945–6	Capt. R. A. Jackson, R.N., F.R.E.S. (dec.)
1947	L. T. Ford, B.A. (dec.)
1948	Col. P. A. Cardew (dec.)
1949	J. O. T. Howard, M. A. (dec.)
1950	Air-Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C., F.R.E.S. (dec.)
1951	T. G. Howarth, M.B.E., F.R.E.S., F.Z.S
1952	E. W. Classey, F.R.E.S.
1953	F. Stanley-Smith, F.R.E.S. (dec.)
1954	Stanley N. A. Jacobs, S.B.ST.J., F.R.E.S. (dec.)
1955	F. D. Buck, A.M.I.PTG.M., F.R.E.S. (dec.)
1956	Lt-Col. W. B. L. Manley, F.R.E.S. (dec.)
1957	B. P. Moore, B.SC., D.PHIL., F.R.E.S.
1958	N. E. Hickin, PH.D., B.SC., F.R.E.S (dec.)
1959	F. T. Vallins, A.C.I.I., F.R.E.S (dec.)
1960	R. M. Mere, F.R.E.S. (dec.)
1961	A. M. Massee, O.B.E., D.SC., F.R.E.S. (dec.)
1962	A. E. Gardner, F.R.E.S. (dec.)
1963	J. L. Messenger, B.A., F.R.E.S. (dec.)
1964	C. G. Roche, F.C.A., F.R.E.S.
1965	R. W. J. Uffen, F.R.E.S.
1966	J. A. C. Greenwood, O.B.E., F.R.E.S (dec.)
1967	R. F. Bretherton, C.B., M.A., F.R.E.S. (dec.)
1968	B. Goater, B.SC., F.R.E.S
1969	Capt. J. Ellerton, D.S.C., R.N. (dec.)
1970	B. J. Macnulty, B.SC., PH.D., F.R.I.C.S., F.R.E.S.
1971	Col. A. M. Emmet, M.B.E., T.D., M.A
1972	Prof. H. E. Hinton, PH.D., B.SC., F.R.S., F.R.E.S. (dec.)
1973	J. M. Chalmers-Hunt, F.R.E.S.
1974	C. Mackechnie Jarvis, F.L.S., F.R.E.S.
1975	M. G. Morris, M.A., PH.D., F.R.E.S
1976	W. G. Tremewan, M.I.BIOL.
1977	R. Tubbs, O.B.E., F.R.I.B.A., F.R.E.S.
1978	G. Prior, F.L.S., F.R.E.S
1979	Rev. D. J. L. Agassiz, M.A
1980	R. Fairclough, F.R.E.S
1981	A. E. Stubbs, B.SC., F.R.E.S
1982	J. Heath, F.R.E.S. (dec.)
1983	B. R. Baker, B.SC., A.M.A., F.R.E.S
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1985	P. J. Baker, C.ENG., F.R.H.S.
1986	J. M. Chalmers-Hunt, F.R.E.S
1987	Prof. J. A. Owen, M.D., PH.D., F.R.E.S
1988	I. F. G. McLean, PH.D., F.R.E.S.
1989	Mrs F. M. Murphy, B.SC
1990	C. W. Plant, B.SC., F.R.E.S.
1991	A. J. Halstead, M.SC
1992	J. Muggleton, M.SC. PH.D. M.I. BIOL., F.R.E.S.
1993	D. Lonsdale, PH.D, B.SC

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Meetings of the Society are held regularly in London, at the rooms of the Royal Entomological Society, 41 Queen's Gate, London SW7 and the well-known ANNUAL EXHIBITION is planned for 22 October 1994 at Imperial College, London SW7. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary, R. F. McCormick, at the address given below.

The Society maintains a library, and collections at its headquarters in Dinton Pastures, which are open to members on the second and fourth Sundays of each month, telephone 0734-321402 for the latest meeting news.

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Cover illustration: Black Darter, *Sympetrum danae* (Sulzer). Photo: R. Williams.

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BREEDING *EURODRYAS AURINIA* ROTT. AB. *VIRGATA* TUTT

RUPERT BARRINGTON

101 Egerton Road, Bishopston, Bristol, Avon BS7 8HR.

E. aurinia ab. *virgata* is characterized by having the central row of upperside forewing black spots greatly reduced or absent, leading to the pale markings extending to form a pale median fascia (Porter, 1989). It is a form that probably occurs from time to time in most colonies of this species, although extreme forms are rare. Some colonies, however, have produced well-developed forms on a regular basis. Hod Hill in Dorset was, in the past, one such locality.

In the field transitional forms from type through to extreme *virgata* may be found, which would suggest that this is an example of multifactorial/polygenic variation. In this type of variation 'a number of different genes may have similar effects and, should they act cumulatively, they may give rise to a graded series of varieties in which distinct segregation cannot be recognised' (Ford, 1945). This is as opposed to recessive, dominant or semidominant aberrations in which a single mutant gene is responsible for the variation, and will, when bred, 'produce two or three clear cut classes' (Berry, 1977) of aberrations in the subsequent generations.

It appears that the terms 'multifactorial' and 'polygenic' (and hence 'single-factor' and 'monogenic' when discussing single mutant genes) are synonymous, as various authors have used one or the other to describe the same phenomenon. Multifactorial is used by Ford (1945) and Berry (1977), whereas Ford (1964), Robinson (1971) and Robinson (1990) use polygenic. Kettlewell (1973) uses both as a heading to his paragraph on this form of variation.

In June 1990 a worn male *virgata* was taken in Dorset. This was placed in a cage with a fresh, wild-captured typical female, and a pairing was soon observed. As the male of this species leaves a permanent plug after mating to ensure that the female will not pair again, it was certain that the female had not mated previously. Two batches of eggs were laid and a brood of approximately 120 adults reared the following spring. This contained two male *virgata* (not extreme), and a small number of transitional forms in the male. All females were of the typical form, as were the rest of the males. A pairing was obtained between a transitional male and a typical female. The weather at this time was cold and windy, and the female waited 7 days before pairing. A single batch of eggs was deposited.

In the spring of 1992 about 100 larvae emerged from hibernation, but they were weak, and many more succumbed to disease than is usual in this species. About 50 adults emerged. The whole brood was graded from type to fully developed *virgata* in both sexes (a male is illustrated here). Expecting pairing to be as easily achieved as is usual with *aurinia*, a number of the most extreme adults were placed in breeding cages, but despite continuous warm and sunny weather no pairings were observed and no eggs laid. The brood was weak, with a number of deformed adults and some that were unable to hang onto the netting of the emergence cage for long enough to allow full expansion of the wings.

The graded nature of the brood supports the suggestion, based on fieldwork, that this variation is multifactorial/polygenic, and it clearly has a weakening effect on the aberrant individuals. This is very much in line with the classic study of a colony of *aurinia* near Carlisle over a period of 55 years as described by H. D. and E. B. Ford (1930) and summarized by E. B. Ford (1945). Here variation increased dramatically when the population rose sharply from a period of scarcity, and many of the aberrations were weak or deformed. They described and illustrated an aberration (*virgata*) which appears to have been the most frequent form of variation in this colony

Fig. 1. *Eurodryas aurinia* Rott. ab. *virgata* Tutt (×1.5 life size).

during a 6-year period of extreme abundance of the species (1894–1899). When the population stabilized aberrations were hard to find. (R. M. Craske (*pers. comm.*) made similar observations during a population explosion of the species near Plaistow, Sussex in 1945/6.) The authors attributed this phenomenon to the fact that weaker, aberrant individuals would have a chance to survive to become adults during a period in which the population was increasing in size from a point far below its average towards its optimum size. This is because, during a period of increasing population size, selection would be less intensive than when the population reached its optimum level.

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SHORT COMMUNICATION

The white-letter hairstreak in south-east London.—One the warm and muggy morning of 17.vii.1994 a large *Buddleja* bush in Nunhead Cemetery, London SE15, attracted only a single butterfly, a rather battered white-letter hairstreak, *Strymonidia w-album* (Knoch). This was the first time I had encountered the species in Nunhead, although a dead hairstreak caterpillar was brought to me, from the cemetery, some years ago. The several hundred large English elms, *Ulmus procera* Salisb., which punctuated the cemetery grounds were killed in the 1970s by Dutch elm disease; many of their trunks still lie prostrate in wooded corners. Suckers and sapplings are regenerating; they now reach about 6 m high and the disease is reappearing to kill a few each year. The butterfly is obviously very local in the London area, but its appearance in Nunhead (vice-county 17, "Surrey") may support ideas that it is recolonizing as elms regrow.—Richard A. Jones, 13 Bellwood Road, Nunhead, London SE15 3DE.

SEPARATION OF SOME *ERISTALIS* SPECIES USING ABDOMINAL COLOUR PATTERN

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Some sets of hoverfly species are rather difficult or laborious to separate in the field (e.g. *Baccha* spp., *Paragus* spp., *Sphaerophoria* spp.) and collectors often decide to capture a few to identify them later on with the aid of a microscope. When all species concerned are interesting for one reason or another this poses no real problem, but occasionally a rare or scarce hoverfly resembles a particularly abundant species. In this situation many records of the less common species may be completely overlooked and, consequently, an accurate picture of their distribution and abundance may take a very long time to emerge. Any studies on long-term population changes in a species such as this would have little value given the unreliability of past distribution and abundance estimates.

Stubbs and Falk (1983) describe *Eristalis abusivus* Collin as a "local" species but "the commonest *Eristalis* in some coastal districts". The separation of *E. abusivus* from the closely related *E. arbustorum* (L.) is relatively straightforward, but requires inspection of the fine structure of the arista. Other characters that can be used include the distance over which the eyes touch in the males (van der Goot, 1981) and the amount of yellow on the tibia of the middle leg. Apart from perhaps the eye character in the males, none of them are very accessible to use in the field. However, the biggest problem is that similar species, such as *E. arbustorum* and *E. nemorum* (L.), are so abundant and widespread. In a mass of *Eristalis* species, not many entomologists would be prepared to devote time to checking hundreds of individuals on the chance that a few *E. abusivus* are present. Stubbs and Falk (1983) also consider it likely that this species is overlooked in the field.

Recently, I carried out a study of colour variation in certain *Eristalis* species using museum specimens held at the Natuurhistorische Museum in Leiden, The Netherlands (Holloway, 1993). The sample sizes were large and for *E. arbustorum*, *E. abusivus* and *E. nemorum* 3169, 843 and 826 individuals were inspected, respectively. Using these specimens, I was able to ascertain not only the amount of pattern variation shown, but also any consistent pattern differences among the species (Figure 1). Although this type of quantitative variation is not generally considered useful to identify species, I found, in the course of my study, that I was able to identify many individuals immediately solely on the basis of their colour pattern. A couple of *E. arbustorum* that had somehow crept into the *E. abusivus* boxes stuck out like sore thumbs! It occurred to me that colour pattern differences may be a quick and easy way of provisionally assessing in the field the occurrence of *E. abusivus*. Having captured a likely looking candidate, the accepted qualitative characters could then be used to confirm identification.

There was always a considerable difference between the sexes in all species with most of the variation in females occurring on tergite 2 and in males on tergite 3. There were a number of important consistent differences between the colour patterns of *E. arbustorum* and *E. abusivus*. In *E. abusivus*, the yellow patches on the abdomen never touched the trailing edge of tergite 2 in females and tergite 3 in males. In *E. arbustorum*, the trailing edges of these tergites were often reached by the yellow patches. In female *E. abusivus*, the yellow patches on tergite 2 when present assumed a hooked shape, whilst in female *E. arbustorum* the yellow patches were more

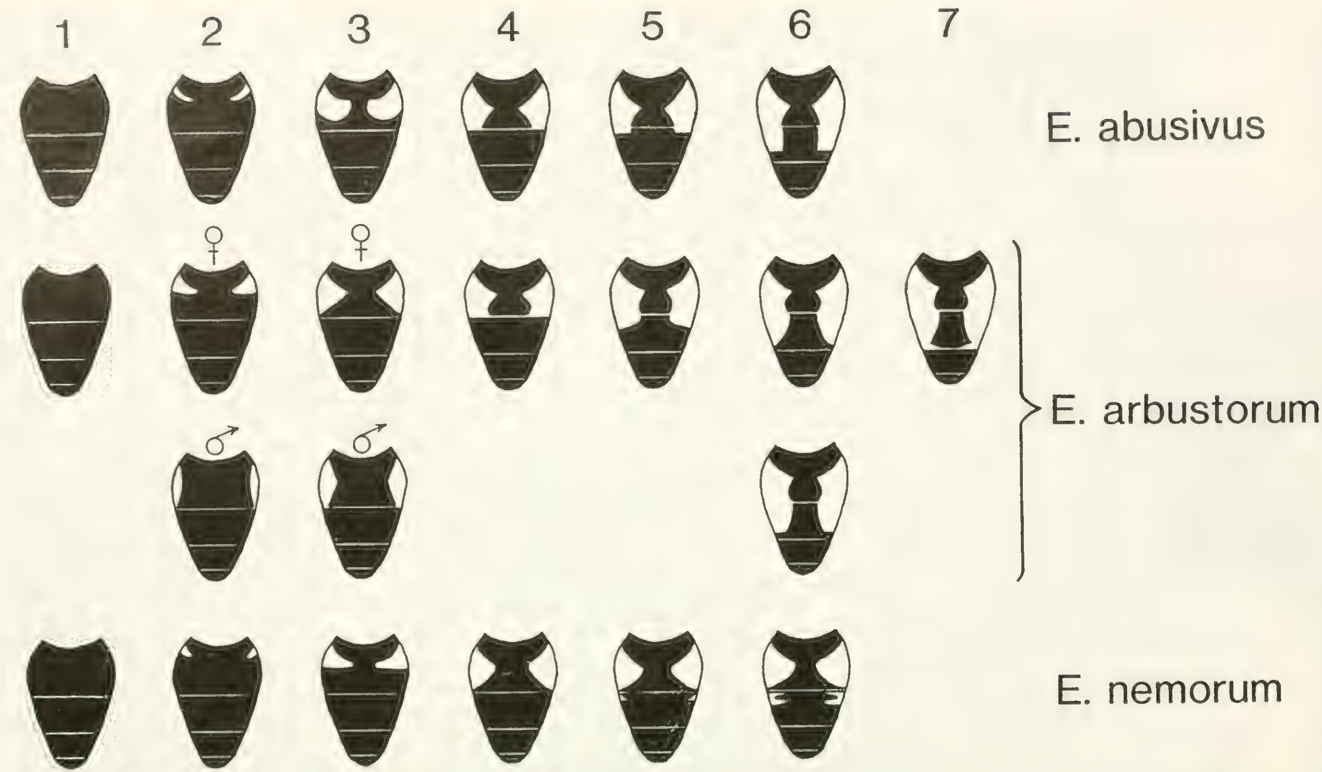

Fig. 1. Scheme used to classify extent of yellowish markings on abdominal tergites in three species of *Eristalis* hoverflies. Range of patterns in *E. arbustorum* placed into category 6 is shown. Categories 2 and 3 differed between the sexes in *E. arbustorum* as indicated.

triangular. In male *E. abusivus*, the yellow patches on tergite 3 were squarish with the vertical inner edge and the bottom edge of the yellow patch forming a 90° angle. In male *E. arbustorum* the inner edge of the yellow patch on tergite 3, more often than not, curved outwards towards the lateral margins of the tergite. Of course, colour pattern could not always be used. For example, the females of both species are sometimes devoid of all paler pigmentation on the abdomen. However, over 60% of female *E. arbustorum* were assigned to the categories 3 and 4 shown in Figure 1 and over 30% of female *E. abusivus* were category 3. All of these insects could be instantly identified without reference to further characters. As for the males, over 85% of *E. abusivus* were of category 6 and over 60% of *E. arbustorum* fell into category 6 or 7. Again, all of these individuals were easy to identify. Clear differences also existed between *E. nemorum* and the other two species, as can be seen from Figure 1, which again facilitate separation of *E. abusivus* from *E. nemorum*.

This study was carried out using insects that were collected in The Netherlands. It is likely, although yet to be established, that the range and type of colour variation shown by *E. abusivus* in Britain is the same as found in The Netherlands. If this indeed proves to be the case, then colour pattern differences could be a useful way of screening large numbers of *Eristalis* species quickly and efficiently.

Acknowledgement

I am very grateful to Dr Peter van Helsdingen for allowing me access to the Syrphidae collection at the Natuurhistorische Museum in Leiden, The Netherlands.

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ANNOUNCEMENT

Librarian needed.—I am leaving this position after the 1995 annual general meeting, having performed this function since 1982. Therefore a replacement person is sought for this post as soon as possible. The main duties are to monitor the members' use of the library using computer methods, purchase new material, monitor existing exchanges of journals and arrange new exchanges with other entomological organizations and manage the organization and shelving of the stock.

The new facilities at Dinton Pastures, combined with the installation of a new computer to use with the society's existing library database make the job of library management somewhat easier than it used to be at our old rooms in South Audley Street. However attendance is required at the new rooms once a month, as a minimum, to open the post, record and shelve incoming items and monitor loans.

Due to ever-increasing work commitments and other considerations I feel I can no longer give as much time to the position as it requires. A full description of the duties of the post are available from me, Stephen Miles, Librarian, 469 Staines Road West, Ashford, Middlesex TW15 2AB, tel: 0784 252274.

BENHS INDOOR MEETINGS

11 January 1994

The President, Dr D. LONSDALE, announced the deaths of Mrs K. Emmet and Mr C. B. Ashby.

Mr R. A. JONES showed three 'bird nest' beetles, *Hister merdarius* Hoffmann, J., (Histeridae), *Quedius ventralis* (Aragona) and *Q. brevicornis* (Thomson, C. G.) (Staphylinidae), collected from Honor Oak, S.E. London, on 7.i.94 from nest material in a hollow tree (probably oak) exposed after wind had torn off a large branch. All three species are regarded as very local or rare and are specifically associated with birds' nests. There was no way of knowing what had made the nest, composed of a mixture of leaves and wood mould, but the presence of two specimens of the flea *Orchopeas howardi howardi* (Baker) suggests that its host the grey squirrel had used the nest fairly recently. Although the grey squirrel must be about the commonest wild mammal in this area, this was the first record of the flea in the 10-km square TQ37. Mr R. S. George kindly identified the flea.

Mr D. HACKETT showed a male specimen of the spring usher moth *Agriopsis leucophaearia* (D. & S.) close to the melanic form *merularia* Weymer. It had been beaten from holly in Queens Wood, north London, on 8.i.94. This appears to be an early date for a moth more usually seen in late February and March.

Mr R. SOFTLY said that he had also taken *A. leucophaearia* recently at light in Hampstead and agreed the first week of January was early for this species.

Mr S. MILES drew the meeting's attention to copies of the Wildlife Link newsletter and Annual Report for 1992, which were made available.

Dr C. GIBSON spoke on the subject of "Insects and habitat restoration". The talk was based largely on the restoration of limestone grassland at Wytham Wood, Oxford. This ancient woodland has a number of grassy clearings which were converted to arable farming but have now been allowed to revert to grassland. Before restoration can be attempted, or its success monitored, it is necessary to know what plants and animals were present in the past. The degree and speed of colonization is largely dependent on how much of the original fauna and flora has survived in uncultivated patches and how close these are to the restored areas. Recolonization has to take place in a sequential manner with plants establishing first before their associated invertebrate faunas can develop. Some insects, however, had arrived in the restored areas at Wytham before their typical food plants were established. It was found that the brown argus and marbled white butterflies had been able to colonize the area by switching to alternative host plants.

It can take 100 years or more for the floral diversity to become indistinguishable from the original grassland, so restoration is inevitably a long-term process. Plant colonization can be crudely divided into three phases. The early colonizers predominate in the first 5–10 years, followed by a second group that flourish after 10–100 years but later decline. The third group does not occur in numbers until the grassland is about 100 years old. Each of these three groups has its own associated insect fauna. Although the early colonizers are mostly common species, in some situations they may include scarce or local insects. At a Center Parcs holiday complex in the Breckland it was found that the grey carpet moth, *Lithostege griseata* (D. & S.) quickly took advantage of the growth of flixweed that grew on disturbed ground. The management plan for the site now includes rotovating strips of land to maintain the habitat requirements of the moth and its host plant.

The insect fauna and plants at Wytham, especially in the grassy areas, have been well documented in the past. Experimental plots have been set out to monitor the return

of plants and invertebrates to the restored areas. The research has four main aims. These are: (1) to update the records for certain selected groups of invertebrates in and around the core experimental areas; (2) to establish suitable sheep grazing regimes; (3) to monitor the distribution and structure of plants on the site; (4) to monitor the distribution and abundance of insects and spiders on the site. The main sampling method for invertebrates is the use of vacuum suction equipment. The target groups of invertebrates selected for the survey are Coleoptera, spiders, leafhoppers and heteropteran bugs, as these are suitable for collection by this means. Leaf miners are also recorded as their feeding activities enable many species to be identified, even if the insects are no longer on the plants. Certain target species of plants and their associated insects have been intensively surveyed to map their arrival and distribution through the plots.

Dr Gibson concluded that the early indications of the survey are that in the right places a great deal can be achieved quite quickly in restoring the habitat, and with a suitable management regime it should, in the long term, be possible to regain something resembling the original ancient grassland.

22 February 1994

Mr R. A. Jones showed a range of specimens of *Mycetophagus piceus* (F.) (Coleoptera: Mycetophagidae) collected under the fungoid bark of an oak stump in Knole Park, Sevenoaks, Kent, on 15.xi.93. The delicate pattern of this species varies from light with darker markings to dark with lighter markings. The range of patterns is aptly summed up by a term one might borrow, or translate, from German authors—Aberrationsspektrum.

Mr Jones also showed a specimen of *M. quadripustulatus* (L.). Typically this species varies very little; it is dark brown or black with four large orange spots on its elytra. However, this specimen, from under the bark of a sycamore tree on Bookham Common, Surrey, found on 13.xi.77, showed a peculiar departure from this. The anterior spot on the left elytron was drawn out behind into a long droplet-shaped appendage, while just in front of the posterior mark on the right elytron was a small supernumerary spot. Whatever process caused the aberrant pattern, its development was controlled independently across each of the beetle's wing-cases.

Mr Jones's third exhibit was of a specimen of a *Philonthus* spp. (Coleoptera: Staphylinidae) attacked by a parasitic entomophagous fungus. The beetle was found dead among grass roots near Hengistbury Head, Bournemouth, Dorset, on 8.viii.93. The unidentified fungus was characterized by long sinuous tendrils extruded between the chitinous plates of the insect's body.

Mr C. W. Plant showed a specimen of *Hemerobius fenestratus* Tjeder (Neuroptera: Hemerobiidae). This lacewing was added to the British list by the exhibitor when he took a male during a BENHS field meeting at Etchden Wood, East Kent, in 1986. This was the only British record until the exhibited specimen, a female, was taken in a Rothamsted light trap by Geoff Burton in his garden at the Isle of Sheppey, East Kent, between 30.vii and 5.viii.92. It is closely related to *H. pini* Steph. and *H. contumax* Tjeder, all three originally being regarded as a single species. It can, however, be distinguished in the field by the lack of dark shadowing on the outer series of gradate cross-veins in the forewings and the transparent forewing patch anterior to the cubital vein, from which the specific epithet *fenestratus* is derived.

Mr A. J. Halstead showed an undersized male *Platystoma seminationis* (L.) (Diptera: Platystomatidae). It had a wing span of 8.5 mm and body length of 4 mm, compared with the more usual 12 mm wingspan and 6 mm body length. A typical male

and female were shown for comparison. All three specimens were swept from chalk grassland at the BENHS field meeting at Therfield Heath, Royston, Herts, on 29.v.93. The larval stage of this fly has been recorded as feeding in a fungus, *Tricholomopsis rutilans*.

The following persons have been elected as members: Neil Arnold, James Brock, Paul A. Boswell, Wolfgang Billen, Gareth King, Graeme P. Smith and Malcolm Cotterill.

Mr R. D. Hawkins reminded members that the Society's hoverfly book had been reprinted and was available again.

Dr P. Waring described his experiences with two overwintering goat moth larvae, about 7 cm long, that he is rearing. These are recorded in the literature as making a cocoon in which they overwinter and then sometimes making another in the spring in which they pupate. He was keeping the larvae indoors at 50–60°F in plastic boxes with some soil and with brown bread and half apples as food. From time to time the food material needs replacing as it becomes mouldy. Each time when the larvae have been disturbed they have remade a loose, coarse cocoon for themselves. They have continued to feed intermittently at about 2- to 3-week intervals. One larva had moulted just after the New Year. A head capsule was found although there was no sign of the cast skin.

The ordinary meeting was closed and was then followed by the Annual General Meeting.

Minutes of the Annual General Meeting of the Society held at the rooms of the Royal Entomological Society of London at 6.30 pm, 22 February 1994. Chairman: The President, Dr D. Lonsdale. Present: 33 members.

Minutes of the last Annual General Meeting were read and signed.

The Secretary read the Council's report, followed by the Treasurer who read his report. The Treasurer then invited questions on his report but there were none. The Editor, Librarian and Curator then read their reports and Dr M. J. Scoble read the report of the Hering Memorial Fund. The President proposed the adoption of the reports; this was seconded by Dr I. F. G. McLean and passed unopposed.

The President then read the names of the Officers and Members of Council recommended by the Council for 1994–95 and, as no other names had been submitted, he declared the following duly elected. President: Dr P. Waring; Vice-Presidents: Dr D. Lonsdale, Dr M. J. Scoble; Treasurer: A. J. Pickles; Secretary: R. F. McCormick; Editor: R. A. Jones; Curator: P. J. Chandler; Librarian: S. R. Miles; Lanternist: M. J. Simmons; Building Manager: P. J. Baker; Ordinary Members of the Council: B. R. Baker, J. R. Dobson, A. J. Halstead, C. Penney, S. C. Pittis, J. Muggleton, I. F. G. McLean, G. A. Collins, D. Young and R. K. Merrifield.

The Secretary then read Bye-law 26(d) and invited motions or questions. Mr R. Softly asked about the vacant Trustee position. Mr Pickles said that Rev. D. Agassiz had agreed to become a Trustee of the Society.

The President then read his report and gave his address.

The President then installed the new President, Dr P. Waring.

The President proposed a vote of thanks to the retiring President, and this was seconded by Mr D. Young. The President asked for permission to publish the Presidential address, and this was given.

Rev. D. Agassiz gave a vote of thanks to the retiring Officers and Council.

Auditors: The President proposed the election of Mr R. A. Bell and Col. D. H. Sterling as Auditors for the coming year with Council being empowered to appoint registered auditors under the Charities Act if necessary. This was seconded by Mr C. Plant and Mr R. Softly and passed unopposed.

8 March 1994

The President, Dr P. Waring, showed a cocoon of the striped lychnis moth, *Cucullia lychnitis* Ramb. (Lepidoptera: Noctuidae). He had collected larvae in 1991 and, although some adults had emerged in 1992, a greater number were produced in 1993. Delayed emergence is well known in this species. The larvae prefer to feed on the flower spikes of *Verbascum nigrum* L., which is a biennial or short-lived perennial plant. The extended adult emergence may help the species survive years when flowering plants are scarce.

Miss L. Farrell circulated a copy of a newsletter on Shetland Lepidoptera produced by a newly formed entomology group in the islands.

Mr R. Softly showed two colour transparencies of larvae of the belted beauty moth *Lycia zonaria* (Harrison) (Lepidoptera: Geometridae) found feeding in an area of machair grassland on Iona in mid-June 1990.

The following persons have been elected as members: Paul R. Mabbot, John Arthur Thompson, David Graham Hemingway, John Leslie Dyer, Robin Williams, Roger Guy Gaunt, Roland Humpheryes, Edward Lawrence Bee and John Szczur.

Mr A. J. Halstead and Dr Waring reminded members of the forthcoming workshops to be held at Dinton Pastures. The clearwing meeting on 23 April would be followed by light trapping in the evening.

Miss Lynne Farrell spoke on "Wild flowers in the Highlands and Islands of Scotland". The lecture took the form of a journey through some of the prime botanical sites in Scotland, starting in Angus and going through Ben Lawers, Mull, the Treshnish Isles, Skye, Orkney and Shetland. Many of the alpine plants shown have a very restricted distribution and are at risk from overgrazing, plant collectors and, in some cases, dry summers. Miss Farrell described some of the work she has done to assess the population sizes and distribution of some of the rarer plants. Quadrats and transects are used to assess plant density and photographic records are kept of the size of colonies. Similar measurements in subsequent years indicate any changes in the plants' status and provide an indication of the success or otherwise of the site's management regime.

The lecture was not without entomological interest. Slides were shown of the burnet moths *Zygaena loti* (Rowland-Brown) and *Z. purpuralis* Tremewan on Mull, the scarce chrysomelid beetle *Chrysolina crassicornis* (Hellie.) on Skye, the bumble bee *Bombus muscorum* (L.), the hoverfly *Sericomyia silentis* (Harris) and local forms of the red carpet and ghost swift moth on Shetland.

In recent years the waters around Shetland have become busy with shipping due to the oil industry and the increase in fish processing vessels. The poor condition of some of the latter, coupled with the severe weather encountered in the area, result in shipwrecks which can have a major impact on wildlife. The speaker showed slides of several wrecks, including the oil tanker *Braer*. The oil spillage from the tanker seems to have had little lasting effect on the higher plants on Shetland but mosses and lichens have been killed by oil blown onto the land.

12 April 1994

The President, Dr P. Waring, showed some distribution maps for Great Britain of moths based on post-1980 records which update maps given in *The butterflies and moths of Great Britain and Ireland*. The maps indicated the changing status of some moths. The oak tree pug appears to be more widespread than before 1980 but this probably reflects improved recording and it is no longer classified as notable. The sloe pug, which was new to Britain in the 1970s, is now known to be widespread. The

obscure wainscot is expanding its range, especially in Yorks. and Lincs. The satin lutestring is common in the Weald of Kent and occurs in pockets along the west coast but remains a nationally uncommon species. Dr Waring referred to the need to have a regionally notable classification. He also circulated a map indicating "hot spots" where scarce macrolepidoptera requiring further recording and research occur.

Mr R. A. JONES showed specimens of *Calopteron discrepans* (Newm.) and *C. terminale* (Say) (Coleoptera: Lycidae) and a large unidentified ichneumon species, all from tropical oak woodland in central Florida, USA, in March 1994. Beetles of the family Lycidae (net-winged beetles) are said to be distasteful to predators. Most are brightly and warningly coloured red and black. Various other insects are said to mimic them, including several black and red arctiid moths. Despite the obvious differences between the set specimens of beetles and ichneumons, there exists a remarkable similarity when observed on the wing. The Florida sunlight is strong and harsh, and even in the dappled undergrowth, motes of light are bright and piercing. The dark body and wings of the ichneumon contrast with the extremely pale antennae which are held straight out sideways in flight. The pale flash of these antennae, seen when the insect flies through a spot of light, resembles the lycid elytra, also held straight out in flight. The resemblance, at least to the human eye, was quite startling.

Mr Jones also showed some slides of what were thought to be fungus gnat larvae (Diptera: Mycetophilidae), found under a fungoid oak log in Nunhead Cemetery, 9.iii.1994. The vermiform (worm-shaped) larvae were contained in tubules of slime, through which they moved back and forth. Associated with them were several flexible and mucilaginous cocoon-shaped structures also exhibited, though now dry and crisp. These were thought to be either larval retreats or pupal cocoons.

Mr P. CHANDLER suggested that the larvae might be those of the mycetophilid subfamily Keroplatinae.

Mr R. UFFEN showed a live specimen of a solitary bee *Andrena chrysosceles* (Kirby) which had a female *Stylops* sp. (Strepsiptera: Stylopidae) protruding between the fourth and fifth tergites. A live male *Stylops hammella* Perkins swept from the same bee colony at Datchworth, Herts, was also shown.

Mr R. SOFTLY showed a live tawny pinion moth, *Lithophane semibrunnea* (Haw.) (Lepidoptera: Noctuidae) taken in a light trap in his garden in Hampstead. This is a very local species in the London area although it does appear to have become more frequent in recent years; 1992 was a record year with 13 being recorded in the trap. Mr Softly noted that despite this moth emerging in the autumn and overwintering, all of his records were of moths in the spring. He also displayed some publicity brochures about books on African butterflies and Australian insects.

Mr A. J. HALSTEAD showed a male sawfly, *Nematus myosotidis* (F.) (Hymenoptera: Tenthredinidae) taken in the Middle Marsh area of Dinton Pastures Country Park, Berks., 27.vi.93. This specimen, of a common species, was noteworthy for its aberrant antennae. Both had a small but distinct spur on the underside of the fifth segment; normally the filiform antennae have no adornments.

The President said that Mr Roger Morris, the Field Meetings Secretary, wished to give up this post. A replacement is needed, preferably before the Annual Exhibition, which is a good opportunity to line up leaders for the following year's programme of meetings. He also reminded the meeting of the special meeting, to be held during the ordinary meeting of 10 May, which would appoint a new trustee and amend the constitution.

The President reported that he had found a common pug, *Eupithecia vulgata* (Haw.) on his house. This appears to be an early emergence.

Mr Halstead reported that the sawfly workshop held at Dinton Pastures on 19 March had been very successful with 18 persons attending.

Dr SIMON LEATHER spoke on insects on bird cherry (*Prunus padus* L.). The bird cherry is a native British tree mainly found growing naturally in northern Britain. It has 28 species of insect associated with it, including three added by the speaker during the course of his studies. This compares with 153 species associated with *Prunus spinosa* L., 67 species with *Prunus domestica* L. and 40 species with *Prunus avium* (L.) L. It would appear that *P. padus* and *P. avium* are under-represented in terms of associated insects in Britain.

Dr Leather gave some details of the leaf beetle *Phytodecta pallida* (L.). This polyphagous chrysomelid beetle is one of the species that Dr Leather added to the bird cherry's insect list. At his main study site at Roslin Glen near Edinburgh, adults emerge in March and lay eggs in April. Larvae are present from April to June and pupate in July. Adults emerge in July but later return to the soil where they overwinter. The adults and larvae eat holes in the leaves.

The main part of the talk concerned the bird cherry aphid, *Rhopalosiphum padi* (L.), the bird cherry small ermine moth, *Yponomeuta evonymella* (L.) and their inter-relationships. The former overwinters on bird cherry as eggs which are often placed in bud axils. They hatch at bud-burst and give rise to several generations of wingless female aphids that cause a downward rolling of the leaf margins. In early summer winged females develop and migrate to cereals and other grasses. In late summer and autumn there is a return migration of winged males and females. In mild areas the aphid can persist on grasses all the year round. Numbers of the aphid on bird cherry vary from year to year. The date of arrival of aphids on the tree at the end of summer varies from August to September with the majority arriving in October. The overwintering mortality of eggs is about 70–80% regardless of numbers laid. Eggs placed in the favoured position between the buds and stem are more likely to survive than those placed in more exposed positions. Counts of eggs during the winter are being used as a means of warning farmers of potentially bad bird cherry aphid years when cereal crop spraying will be necessary. Heavy infestations on bird cherry in the spring can cause the shoot tips to die back and more than ten aphids per leaf can cause no fruits on the tree. This damage also changes the physiology of the plant with the shoots developing with buds more closely adpressed to the stems which have shorter internodes between the buds. Such shoots provide better egg-laying sites for the aphid later in the year. Roadside trees were noted as being more heavily infested than those in woods, and they also had a lower winter egg mortality, possibly as a result of fewer predators being on roadside trees.

The small ermine moth lays batches of 50–100 eggs on young shoots in August. These hatch and overwinter as first instar larvae under the protective shield formed by the egg mass. The caterpillars become active in the spring and begin webbing the foliage. By mid-summer they may have caused severe defoliation and covered the tree in spectacular swathes of white silk. Woodland trees are generally more heavily infested than exposed trees, possibly because the weak-flying adults need shelter. Counting the number of overwintering egg shields gives a good correlation with the degree of summer defoliation.

A negative correlation was noted between numbers of bird cherry aphid eggs and the egg shields of the moth. In experiments with trees artificially defoliated to varying degrees it was found that fewer aphid eggs were laid on the more severely defoliated shoots. This effect on 2-year-old trees was still apparent up to 5 years later. When small ermine moths naturally invaded the experimental plot, the heavily defoliated plants were targeted as egg laying sites. The shoots on these plants have more widely spaced buds which are less closely adpressed, which creates more space for the moths to lay. This research shows that the aphid and moth are in competition for egg laying sites and both insects are capable of altering the host plant's growth pattern to their own advantage.

10 May 1994

The President, Dr P. WARING announced the deaths of Dr Basil MacNulty and Mr Gaston Prior. Both were former presidents of the society.

Mr R. A. JONES showed a dwarf specimen of the common leaf-rolling weevil *Apoderus coryli* (L.) taken by sweeping in Hoe Copse, Midhurst, West Sussex, 18.vi.1978. The species is known to vary somewhat in size and is usually quoted as being 5.9–8.0 mm long. At 5.3 mm the specimen fell well outside this range.

He also showed a specimen of the seven-spot ladybird, *Coccinella septempunctata* (L.), taken near Dade City, central Florida, USA, on 21.iii.1994. This Eurasian species was first released in the USA in 1956. Over the next 15 years it was introduced in several Atlantic and mid-western states, but establishment was not confirmed at any of the release sites. The first confirmed records of permanent establishment in North America were in New Jersey and Quebec in 1973. By 1988 the beetle was recorded from 39 states and it continues to spread westwards.

Dr P. WARING showed a larva of the goat moth, *Cossus cossus* (L.), that he had been rearing. It was unusually small and pale in colour, and may be parasitized. While replacing the food material in the rearing box, Dr Waring had discovered a tipulid larva in the caterpillar's feeding gallery in the apple. It had presumably been introduced with soil placed in the bottom of the rearing box.

Mr A. J. HALSTEAD showed a live specimen of *Trox scaber* (L.) (Coleoptera: Trogidae) collected in his garden at Knaphill, Surrey. E. B. Britton in the RESL handbook on Scarabaeidae (1956), described *T. scaber* as occurring "in dry animal remains, wood mould in oaks and elms, and birds' nests". L. Jessop in the 1986 revision of this work describes it as occurring "in birds' nests in hollow trees (mostly owls' and other nests containing bones) and in detritus of animal origin". It also occurs on the inside of the exhibitor's compost bin, where there are no nests or bones. It seems likely that this beetle has much less specialized requirements than has been suggested and it can probably breed in a wide range of decaying organic materials.

Mr R. D. HAWKINS showed a live specimen of the shield bug *Eurygaster testudinaria* (Geoffroy) (Hemiptera: Scutelleridae) found 10.v.94 on a roadside verge at Horley, Surrey. The specimen had a purplish-red colour, unlike the brown colour typically shown by adults in the autumn.

The following persons have been elected as members: John Edmund Chainey, Simon James Hayhow, Martin Cade, David John Poynton, Toby Howes, Jacqueline Shane, Martin Evans, Derek Harry Howton, Beatrice Gillam and Jonathan Paul Guest.

The scheduled speaker was replaced by Dr Jonathon Denton, who spoke on the natterjack toad and its conservation. The natterjack toad is Britain's rarest amphibian and it has gone from most of the inland sites where it was found earlier in the century. Apart from one heathland site on the Surrey/Hampshire border, it is now confined to coastal sites in East Anglia, north-west England and the Solway Firth. The habitats in these various sites—heathland, mobile sand dunes and salt marsh—are seemingly very different but a common feature is the availability of open ground with sparse vegetation. Natterjacks have good long-distance vision and run after prey, unlike the more sedentary common toad.

During the mating season the males position themselves at the edge of pools and make loud calls that can be heard a mile away at night. After pairing the females lay 2–5000 eggs in warm shallow pools. The tadpole stage lasts 6–8 weeks. The small toadlets remain near the pool and are diurnal for the first month after metamorphosis. Later they become nocturnal and after 6–8 weeks are large enough to be able to make burrows in the ground to avoid desiccation.

Dr Denton described his studies of the natterjack at its heathland site at Woolmer Forest. It prefers the open bryophyte dominated areas, unlike the sand lizard and smooth snake, which are found in the mature heather areas. Suitable ponds have been created to increase the breeding sites, and trees and shrubs have been cleared to enhance the habitat for the toads. It has been found that not all females spawn. In the years 1988–92 the numbers of females recorded varied from 65 to 76 and of these only 34 to 49 produced spawn (44–64% of the female population). This may be due to a shortage of males, since the number of spawn strings produced is directly proportional to the number of males calling. Female natterjacks live for 10–15 years but males do not seem to survive more than 7. This may be due to differential predation by grass snakes. Males are more active at the pond margins during the mating season and may be at greater risk. Increased grazing to reduce the poolside vegetation and remove cover for snakes is being tried to see if this increases the breeding success of the toads.

The natterjack toad is one of the species benefiting from English Nature's species recovery programme. Sites suitable for reintroduction have been identified in Surrey, Dorset, Lincolnshire and Norfolk. The first introductions three years ago in Dorset and Lincolnshire have now produced breeding colonies.

The pools at Woolmer Forest are also notable as being the only British site for the dytiscid beetle *Graphoderus zonatus* (Hoppe). It is also found in Germany and Scandinavia. Little is known about its biology and Dr Denton is attempting to breed it in captivity.

The ordinary meeting was followed by a special meeting to appoint a trustee and to make some amendments to the society's bye-laws.

Minutes of the special meeting

The President, Dr P. Waring, said that it was necessary to appoint a trustee to replace the late Mr C. B. Ashby. He explained that although recent changes in the law relating to charities make all of the society's council members trustees, it is still necessary to have two named persons as "trustees" to be signatories for the society's assets. The person nominated by council as trustee was the Rev. Canon D. Agassiz. The voting, including postal votes, was 56 in favour, none against and one abstention. The Rev. Canon D. Agassiz was duly elected as trustee.

The meeting was also asked to make some changes to the society's bye-laws. These were to delete clauses 4(i) and 32(c), and to change clause 11(a) to "not exceed twelve at any time". The proposed changes will remove the power from the society to pay insurance premiums in order to insure against personal liabilities which may be incurred by its charitable trustees (members of council). This is in accordance with advice received from the Charity Commissioners. The third change, clause 11(a), will increase the number of honorary members to 12 at any one time. The voting, including postal votes, was 56 for and one against. The amendments to the bye-laws were therefore agreed.

ANNOUNCEMENT

Dead caterpillars wanted.—We would be very grateful for any lepidopteran larvae of UK origin killed by baculovirus infection. This is often characterized by whitening, followed by complete liquefaction of the larva, which can then often be found hanging from a prominent position on the foodplant. Samples should be frozen for storage and sent to: Mr Martin C. Townsend, Ecology Group, NERC Institute of Virology & Environmental Microbiology, Mansfield Road, Oxford OX1 3SR, tel: 0865 512361.

OFFICERS' REPORTS FOR 1993

COUNCIL'S REPORT

The Society's membership stood at 704 at the end of the year, a small increase on the numbers for the previous year. Forty-five new members were elected during the year, 17 were struck off for non-payment and 21 members resigned. Ten deaths were reported to the Society during 1993.

Special thanks are extended by all the Council members to Mr Geoff Burton for the work that he has done for the Society over the past 10 years. Mr Burton is, until a replacement can be shown the ropes, our Assistant Treasurer and he now wishes to resign as he feels that he has done his bit for the Society. We all wish him well and again thank him for doing such stalwart work for us.

The Council met eight times during 1993 and, on average, 15 members attended each meeting. Much of the Council's time was taken up in discussing Dinton Pastures, (the Pelham-Clinton building). There are ongoing problems with the air conditioning and alarm systems. The two Council members who have taken on the brunt of attending for engineers' visits have been our hard-working Curator, Mr Peter Chandler, and our designate Building Manager Mr Peter Baker. Our thanks go to these hard working members and to the other members who have helped with this work. Other items that have taken up the Council's time included the new Charities Act which has needed careful discussion in order to make changes to the Bye-Laws. A special meeting for this was held in September. Another time-consuming topic was consideration of J.C.C.B.I. and related environmental issues.

The Pelham-Clinton building was officially opened on 27 June 1993, by Professor Sir Richard Southwood and was well attended. A buffet was prepared in the Loddon Room and the people who came enjoyed a sunny outdoor feast. Open days have been arranged on a fortnightly basis and have attracted good numbers of members each time. In addition a series of five workshops has been arranged by Dr I. F. G. McLean and these have attracted between 15 and 20 people to each meeting. Our thanks, again, go to the hard working members of Council who are making our new premises a resounding success.

The Society continued to represent members' interests in the field of conservation and Mrs F. M. Murphy and Mr S. R. Miles take an active part as the Society's representatives on the Joint Committee for Conservation of British Invertebrates. The Society continues to subscribe to Wildlife Link.

There were 10 indoor meetings, held at the Royal Entomological Society rooms, and a joint meeting with the London Natural History Society which was held at the rooms of The Linnean Society in Burlington House, Piccadilly. In general, attendance at indoor meetings was improved with around 20 people attending each time; this is probably because of the hard work put in by our Indoor Meeting Secretary, Dr McLean, in arranging speakers for these events. The increased interest of the membership in these organized events makes it more rewarding for the Council members involved. A full programme of events is being prepared for 1994/95.

Fourteen field meetings were held in wide-ranging areas of the countryside, including two at Dinton Pastures Country Park; this is part of an ongoing effort to establish what species are living in our own back yard. Attendance at these was low and Mr Roger Morris would like more members to attend field meetings since, more often than not, a great deal of effort has been made to obtain permission to get onto some sites, and since the leaders of these meetings have made the effort to volunteer in the first

place. Mr Morris would also like more members to put their names forward to lead future field meetings.

A successful Annual Exhibition was organized by Mr Michael Simmons; it was attended by 200 members and 70 visitors, around the same numbers as attended the previous year. There were around 175 exhibits with the usual slant on the Lepidoptera but with a welcome increase in the "other" orders. The Council introduced new guidelines to stop controversial exhibits from being shown at the Exhibition. The aim is to stop long series of any species from one locality, unless for a specialized reason, from being shown. Dr Basil MacNulty again organized the Annual Dinner with his customary skill, and the event was considered a success with 40 members and companions sitting down to a meal that was enjoyed by all. This item is still on the agenda for discussion at this year's meetings of the Council.

TREASURER'S REPORT

This last year has seen the final payments for building and equipping Dinton Pastures which has enabled reorganization of our finances onto what hopefully will be a stable basis for the future.

The plans to end the distinction between "London" and "country" members announced last year have come into effect and this necessitated changing our bye-laws. We took the opportunity of a change in subscription rate to introduce covenanted subscriptions which will be held at the current level for 4 years. Initial response is good with about a quarter of our membership having taken this option. The Society will benefit by some £500 a year in reclaimed tax. The suggestion to covenant was first mooted some 30 years ago, I believe, but it is only now after a relaxation in the views of the authorities and protracted negotiation with the Inland Revenue that we have been able to proceed.

The Charities Acts lay a duty of stewardship on Council and it was with this in mind that a firm of financial consultants, Edward J. Mercy and Co. Limited were consulted about our investments. Their proposals, to move the bulk of our cash deposits to investment bonds, set up to comply with the requirements of the Trustees Act, were put into effect just before the year end. We look forward to seeing the benefits of this in the future as interest rates on deposits have fallen to such a low ebb. I am also pleased to say that our consultants have donated some £1160 to us from commission earned on these transactions.

The income and expenditure account shows that our income has fallen by over half following the reduction in interest received, as a result of both lower rates and lower deposits, and the more normal level of donations received. The cost of running the Society has been £13 751 and £6275 for producing the journal. This has been financed by the expected £8000 subscription income with the balance coming from investment income, including £5367 from the bequest fund. The budget for 1994 does not envisage major changes from this level of activity.

The balance sheet shows that Dinton Pastures and its equipping reached a final cost of £154 736 and that this is being written off over the term of the lease at £2210 a year. The total asset value of the Society is almost unchanged at £352 743. Additionally there is an unrealized surplus on investment values of approximately £40 000.

The new accounting requirements for charities which were expected this year, have not yet materialized. However the accounts comply with current best practice and forecasts of what the act is expected to contain.

Colonel Sterling and Mr Bell have once again audited our books and I extend my own and Council's thanks to them.

Balance sheet as at 31st December 1993

		1993		1992
Capital employed				
General fund				
Opening balance	39589		37978	
Transfer from bequest fund	5367		–	
Transfer from income and expenditure account	(5367)		1610	
		39589		39588
Housing fund	144432		2308	
Contributions from other funds	10304		142123	
Amortization	(2210)		–	
		152526		144431
Special publications fund				
Opening balance	28515		26884	
Surplus from sales	980		1631	
		29495		28515
Bequest fund				
Opening balance	136411		250217	
Income	6451		17357	
Grants & expenditure	(16671)		(131163)	
		126191		136411
Hering memorial fund				
Opening balance	4878		4999	
Income	564		659	
Expenditure	(500)		(780)	
		4942		4878
		352743		353823
Employment of capital				
Leasehold property		144432		5964
Additions		10304		138467
Amortization		(2210)		–
		152526		144431
Quoted investments				
General fund		28036		32077
Hering fund		3540		3540
Investment bonds		139000		–
Current assets				
Special publications	9088		4000	
Christmas cards	289		300	
Sundry debtors and payments in advance	3591		1211	
National savings investment account	–		63131	
Sterling money market deposit	–		80000	
Business reserve deposit	11327		17693	
Bank current account	8070		9825	
	32365		176160	
Current liabilities				
Sundry creditors and accrued expenses	2724		2385	
	(2724)		(2385)	
Net current assets		29641		173775
		352743		353823

Income and expenditure account year to 31st December 1993

	1993		1992	
General account				
Subscriptions		7990		7907
Interest and dividends		11512		24545
Redemption surplus		57		–
Donations and bequests		1330		12507
Surplus on Christmas cards		85		79
Surplus on cabinets and collections		700		–
Surplus on dinners		–		7
Total income		(21674)		(45045)
Headquarters services	3687		486	
Rent and insurance	692		2344	
Headquarters security and maintenance	1348		677	
Council rooms and expenses	1699		1009	
Members' meetings and exhibitions	1503		1759	
Administration	1512		1096	
Library	1165		136	
Donation to R.S.P.B.	250		–	
Subscriptions and donations to other societies	340		208	
Grants towards publications	1000		–	
Moving expenses	–		1379	
Honorariums	350		–	
Cost of dinner	205		–	
Cost of running society		13751		9094
		(7923)		(35951)
Publications account (free to members)				
Sales	(1344)		(1339)	
Bequest fund grant for plates	(1000)		(1039)	
Production of journal	6775		5493	
Distribution costs	1844		1210	
Net cost of journal		6275		4325
Surplus on membership		(1648)		(31626)
Special publications (for sale)				
Sales	(1786)		(3153)	
Opening stock	4000		5074	
Publication costs	5532		–	
Distribution and general costs	362		448	
Closing stock	(9088)		(4000)	
Net surplus on special publications		(980)		(1631)
		(2628)		(33257)
Surplus to Hering fund	564		659	
Surplus to bequest fund	6451		17357	
Deficit on general fund	(5367)		1610	
Surplus to special publications fund	980		1631	
Transfer to housing fund	–		12000	
		2628		33257

Notes to the accounts year to 31st December 1993

Accounting policies

(a) The accounts are prepared under the historical cost convention.
(b) The costs of building and equipping leasehold premises at Dinton Pastures Country Park have been capitalized. The total cost of these premises which were completed during the year to 31st December 1993 are being amortized over the term of the lease. The first amortization charge was made in 1993.
(c) The value of the library, collections, ties, back numbers of proceedings and journals and the computer system is not included in these accounts. Current expenditure on such items is written off to the income and expenditure account.
(d) Donations and legacies are brought into account when they are received by the society.
(e) Surpluses (or deficits) arising on the special publications fund which accounts for publications primarily for sale are transferred to that fund to finance future publications.

Investments

		Book value at cost		Market value
		General & bequest	Hering memorial	
1230	Shell T&T 25p Ord.	477.79	771.83	8991
750	Unilever 5p Ord.	248.45		9322
6270	M&G Charifund Units	19091.17	1147.24	47386
2450.90	Treas. 9½% 1999	771.22	1621.21	2665
3863.71	Treas. 8¾% 1997	3687.94		4087
3882.90	Treas. 9% 1994	3759.57		4038
		28036.14	3540.28	76489

Investment bonds	Total
Hendersons	58000.00
Sun Life	56000.00
Barings	25000.00
	139000.00

Fund movements

The housing fund representing the cost of the Dinton Pastures building has been augmented by a further transfer from the bequest fund. A grant has also been made from the bequest fund towards the cost of colour plates shown in the publications account and towards the general running of the society.

Report of the auditors to the members

We have examined the financial statements attached which have been prepared in accordance with the recommendations of SORP2.

We have audited the financial statements annexed in accordance with approved auditing standards.

In our opinion the financial statements which have been prepared under the historical cost convention give a true and fair view of the state of the Society's affairs at 31st December 1993 and of its income and expenditure for the year then ended.

Col. D. H. Sterling
R. A. Bell

Professor Hering memorial research fund

The committee agreed to support two applications to the Hering Fund for 1994, both involving studies of Tephritidae. Dr Alan Gange (Royal Holloway College, London) was granted the sum of £325 towards the costs of a project on the role of nitrogen in the nutrition of the thistle stem gall fly (*Urophora cardui*), an insect associated with *Cirsium arvense*. This study will assess the importance of nitrogen to the fly when nitrogen levels in galls on the thistle are manipulated.

Michael Bonsall (Imperial College of Science, Technology and Medicine) was awarded £175 for work on parasitoid complexes of thistle Tephritidae. His study will include a critical review of the literature on tephritids and their associated parasitoids and the construction of a quantitative food web describing parasitoid associations. Mr Bonsall's project will require the collection of flowerheads and galls from various sites in the UK and the work will involve identification of the emerging insects.

I have received reports on the results of work from three of the projects supported by the Hering Fund last year. In his study of aspects of the behavioural ecology of members of the gracillariid genus *Phyllonorycter*, Dr Vincas Buda (Institute of Ecology, Vilnius, Lithuania) found, amongst other things, that gravid females of the lepidopteran leaf miner *P. ulmifoliella* seem able to distinguish between the leaf of a hostplant with an egg already laid by a conspecific female and a leaf without an egg.

A grant to Dr Yuan Decheng (Academia Sinica, Beijing) enabled him to undertake collecting trips to the Qinling mountains in Shaanxi and to Mount Longqi in Fujian. Dr Yuan collected about 300 specimens of Gracillariidae, including material he is incorporating into a revision of the genus *Acrocercops*.

David Agassiz used his award for fieldwork in mapping the spread of *Phyllonorycter platani* in south-eastern Britain. This exciting work is part of a programme of research examining the establishment and rate of spread of Lepidoptera that have invaded Britain during the century.

The microscope bequeathed to the Hering Fund by Edward Pelham-Clinton, 10th Duke of Newcastle, continues to be lent to Dr Margaret Redfern-Cameron for her work on insects associated with thistles.

M. J. Scoble

Librarian's report

The theme of this year's report is back to normal at last. I spent the early part of the year compiling a list of possible book purchases to make up for the fact that no new books were purchased while the library was in store. This list was then discussed at a library committee meeting held in June from which a series of recommendations emerged which amounted to a potential expenditure of about £1350; so far approximately 70% of these have been purchased. Other subjects considered at this meeting were: whether the society should purchase new books in future from a single source, thus attracting a negotiated purchase discount; advice on subject classifications of certain books and future developments of the library as a service to members.

Progress has continued throughout the year on confirming that books were identified correctly against the accession number given to them in the library database, during the stocktake performed by volunteers in 1992. Further development of this database in terms of report formats, mail-merge letters, relational look-ups, search strategies, security functions and user instructions has continued concurrently. In this context the next step should be for the library computer committee to re-form to develop a specification for the purchase of a computer for use in the library.

The subject labelling of the library shelves was virtually completed by Martin Albertini in time for the formal opening of the library rooms in June. Many thanks are due to Martin for this work. John Muggleton has continued to compile listings of the journals and has continued to develop their arrangement, work for which I am most grateful. Andrew Halstead has also ably assisted me in the purchase of new books during the year. However despite all of this help due increasingly to the pressure on my spare time I have decided to resign as your librarian in February 1995, therefore a successor must be found, preferably during the next 3 months.

During the year the Hertfordshire Natural History Society announced that they wished to discontinue their journal exchange arrangement with us. A trip was made by me to Oxfordshire to recover some rare books from a member who was too ill to return them to the library. This trip was combined with the purchase and collection of some more new books. The last two functions are typical of the responsibilities attached to this position in the society.

For entomological books, separates and conservation reports sent to the library during the year, thanks are due to E. P. Wiltshire, Colin Plant, Sir Cyril Clarke, English Nature, the Countryside Council for Wales and the Biodiversity Challenge Group.

S. R. MILES

CURATOR'S REPORT

Last year future plans for the collections were projected in some detail and a start has been made towards achieving these aims. Work on rearranging the Coleoptera collections has continued as time allowed and 76 drawers have now been completed, the last six occupied by Cerambycidae, so the main phytophagous families are still to be covered.

The contents of the loose drawers of the Bretherton collection (Papilionidae, Pieridae and Nymphalidae) have been transferred to a 30-drawer cabinet and the Torstenius collection of Swedish Lepidoptera, which was till then in the care of the late Brad Ashby, was returned this January. The proposed reorganization of the Palaearctic butterfly collection will, however, await the availability of the two cabinets being cleared of the Massee Coleoptera collection.

There have been several donations during the year, including a substantial increase to our sawfly collections, i.e. 138 species provided by Andrew Halstead, who has corrected some of the older specimens; specimens of aculeate Hymenoptera were donated by Andrew Halstead and Raymond Uffen and of Homoptera by Bernard Verdcourt. Eighteen store boxes containing larger moths were received from Humphrey Mackworth-Praed, being the duplicate specimens from his father's collection which we received in 1991.

I am grateful to Peter Baker and Bill Parker for sorting the Lepidoptera accessions and for their ongoing selection of specimens to augment the society's main collections of this order. The number of duplicate specimens of Lepidoptera had become excessive and some weeding out of these is now taking place. It has been decided to eliminate the distinction between duplicate specimens freely available to members and the better specimens previously set aside for sale. In future, no attempt will be made to put a price on individual specimens and there will be a single collection of duplicate Lepidoptera, but any member taking specimens will be asked to make a discretionary donation to the society.

A loan has been made of 270 beetles of the family Ptiliidae to Colin Johnson, who revised our material of *Atomaria* some years ago and is now performing this task for *Acrotrichis* and its relatives.

A visit has been made by Adrian Pont to check the H. W. Andrews collection of Diptera for specimens mentioned in descriptions of new species by G. H. Verrall and J. E. Collin, who did not often designate type specimens; he has discovered syntypes of six species and has labelled them accordingly.

Some notes on the history and composition of the Diptera collection were circulated with the *Dipterist's Bulletin* and this has led to offers of material in some under-represented families. A similar account of the Coleoptera will soon be produced in an endeavour to encourage use of this collection. The request last year for input from coleopterists with respect to the layout and revision of the collection has so far resulted in limited response, although Peter Hodge has offered to advise where species believed to be unrepresented may be present under another name; this will give some idea where the attention of specialists would be desirable.

Peter Baker has volunteered to begin working towards an improved layout of the British moths and much thought is being given to the logistics of this considerable task. As always, any members wishing to advise or assist on any aspects of the arrangement would be welcomed.

I am also grateful to Frances Murphy for spending several open days cataloguing the fossil collection received from Ted Wild; her manuscript list has been placed with the collection.

In general there has been steady progress in a number of areas and the controlled environment at Dinton Pastures appears to have been beneficial despite some minor and one or two major fluctuations. We have, however, suffered from the remarkably hard water in the area, which is affecting the humidifying component of the air conditioning system, and water softening for this system is now under consideration.

A few *Anthrenus* larvae were found to have survived in the Bretherton collection and one instance of damage to specimens of the hornet was discovered but it is believed that we are currently free of such infestations.

PETER CHANDLER

EDITOR'S REPORT

As usual, the journal appeared four times in 1993, it contained 192 pages of text and five colour plates. The fifth colour plate, illustrating moths of the family Epermeniidae and the genus Caryocolum was actually printed in 1987, but held over until accompanying text was completed. It is one of several colour plates illustrating papers on the microlepidoptera which will eventually be published together in book form.

The indexes for 1991 and 1992 were published at the end of the year and publication of the journal has continued more or less as usual. There were, however, a few changes which I hope did not pass unnoticed.

We are now using a higher quality of paper, allowing even better reproduction of black and white line illustrations and half-tone figures and the cover is now printed on a stiff card. The redesign of the cover also allows a black and white half-tone picture to ornament it. To date most of these pictures have been supplied by the editor. However, all members are invited to submit photographs for reproduction on the journal's covers. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty and can be in the form of colour or black and white prints or colour transparencies.

RICHARD A. JONES

FIELDWORK AT DINTON PASTURES TO THE END OF 1993

PETER CHANDLER

There were three field meetings and several workshop meetings involving some fieldwork at Dinton Pastures from the completion of the society's building in 1992 and additional fieldwork was done on the Diptera throughout 1993. Information on the insect fauna of the Park was thus accumulating although much remained to be done.

The meeting on 20.ix.1992 was the inaugural open day at the building and a minority of those attending attempted fieldwork although a good start was made in several orders. There had been light trapping near the building by John Muggleton on the previous night and the weather was good for daytime collecting. A surprising range of species was recorded although the park showed evidence of the recent years of drought, with Mungell's Pond significantly lower than it was throughout 1993.

The two field meetings in 1993 were affected by variable weather conditions and less well attended but the daytime meetings were enjoyed by those who came. On 15.v despite predictions of bad weather the morning was fine although windy but sufficient shelter was found behind the hedges on the west side of Black Swan Lake. After a short shower in early afternoon, the sun broke through to illuminate afternoon collecting by the river Loddon. It rained again later and the evening was cold and windy, so that any idea of light trapping had to be abandoned.

The meeting on 18.ix enjoyed reasonable weather during the day. Most of the morning was spent by Mungell's Pond but an afternoon circuit reached Middle Marsh and Sandford Lake. The sky was clear and the evening cold so conditions were far from ideal although better than on many nights in the preceding weeks; it was, nevertheless, decided to try light trapping and David Young ran two lights in the fields adjacent to the Country Park Office until 11.30 pm and a few moths were recorded at the security lights around the buildings; he also tried sugaring trees in the vicinity but this attracted only earwigs.

The findings on these meetings and other useful records obtained on other occasions are detailed under the relevant order so that some idea can be given on the progress made in each group.

Lepidoptera. A booklet produced by the Local Authority in 1985 (on sale at the Country Park Office) included a list of 30 species of butterfly which had by then been reported from the park, several of them single sightings. Only eight species of butterfly were observed in 1993, although it was a poor year for them generally.

Bill Parker has periodically run light traps near the buildings over several years, but his records were lodged with the park authorities and except for one September visit have unfortunately been mislaid. Thus there are three lists now available for that month. The 1992 field meeting recorded 28 species, but in 1993 only 17 species were noted, 12 of them in common.

Fortunately there had been a field meeting of the Reading and District Natural History Society at the Park on 13.vii.1990 when lights were run near Mungell's Pond and 48 species were recorded (communicated to me by Brian Baker). A few other species have been recorded on day visits and Colonel A. M. Emmet reported 18 species, mostly "micros", on the occasion of the opening ceremony on 27.vii.1993. The latter included *Caloptilia rufipennella* (Hübn.) (vacated mines and tenanted cones on sycamore), believed to be new to Berkshire. Ron Parfitt has recorded *Nephopterix angustella* Hübn., which he reared on 29.vi from larvae mining berries of spindle tree. Caterpillars of *Tyria jacobaeae* L. were much in evidence on ragwort during the summer.

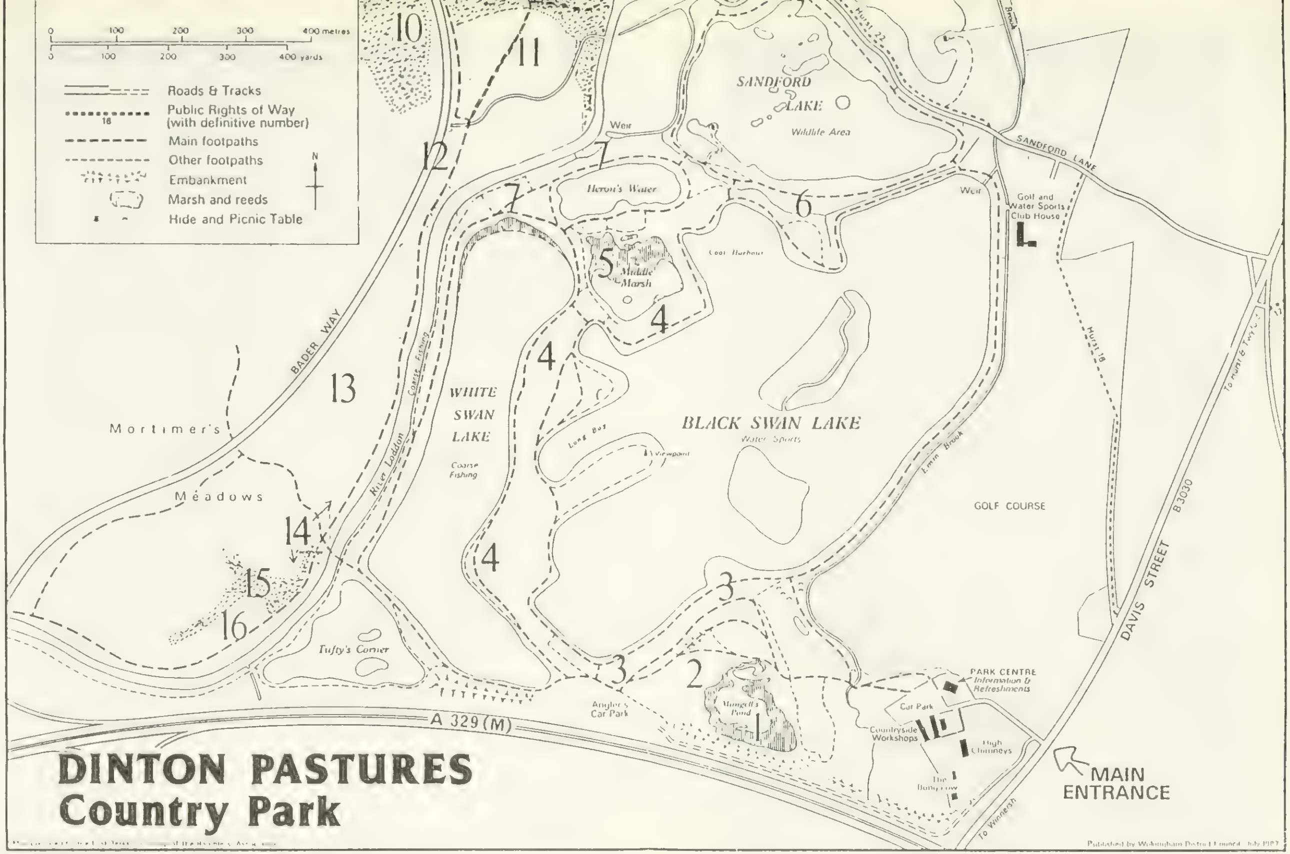

Fig. 1. Map of Dinton Pastures Country Park; numbers indicate areas described in text. Map prepared by the East Berkshire Group of the Ramblers' Association. Published by Wokingham District Council, July 1987.

Knowledge of the Lepidoptera is thus still at an early stage with little more than 100 species of moth so far recorded. Light trapping was thus arranged for several field meetings in 1994 to cover different parts of the Park and further investigation of the "micros" would also be welcomed.

Diptera. On the September 1992 field meeting Ian McLean concentrated attention in the vicinity of Mungell's Pond and found several species of interest, especially Dolichopodidae and Sciomyzidae, which he exhibited at the 1992 annual exhibition. On the same day I investigated the hedges and riverbanks for fungus feeders; I was surprised to find 36 species of fungus gnats including the very local *Megophtalmidia crassicornis* Curt. in two areas, and four species of Platypezidae. *Macquartia grisea* (Fall.) (Tachinidae), a parasite of chrysomelid beetles, was frequent, and two other species of the genus with similar habits have subsequently been found in the Park.

The Diptera Workshop on 8.v.93 preceded the first field meeting by a week, and morning fieldwork was productive, the most surprising find being *Meligramma euchroma* (Kowarz) (Syrphidae), which Alan Stubbs spotted on oak foliage; it is decidedly uncommon with larvae feeding on tree aphids. On the 15.v meeting about 150 species of Diptera were recorded, including 34 species of hoverfly and 14 species of cranefly. The cow parsley flowers near the river were attracting a good range of species including *Cheilosia vulpina* (Meig.) and *Parhelophilus frutetorum* (F.), while Ron Boyce was able to photograph *P. versicolor* (F.) sitting on foliage further along the river. Several other *Cheilosia* species were about including *C. honesta* Rond. and *Epistrophe nitidicollis* (Meig.) was found on oak foliage by the river. Gavin Boyd recorded *Xanthogramma pedissequum* (Harris) near Tufty's Corner. Several of the larger Tachinidae were seen including *Gymnocheta viridis* (Fall.) on tree trunks, *Tachina fera* (L.) and *Pelatachina tibialis* (Fall.) on foliage; the scarce species *Wagneria gagatea* R.-D. was found on both these May visits.

On 18.ix about 125 species of Diptera were recorded, with calypterates especially frequent and 11 species of Sciomyzidae were found; *Dichetophora obliterata* (F.) was in numbers in the lane between the south end of the lakes and Andrew Halstead found *Ilione lineata* (Fall.), which specializes in the freshwater bivalves, near Mungell's Pond. This, with his find of *Euthycera fumigata* (Scop.) by Sandford Lake on the same day, brought the list of "snail-killing flies" (Sciomyzidae) for the Park to 30 (45% of the British species; the other 28 were exhibited by me at the 1993 Annual Exhibition). A few late syrphids on this occasion included *Cheilosia pagana* (Meig.) and *C. vernalis* (Fall.).

Much fieldwork was carried out on the Diptera on 26 other dates during 1993 and with the assistance of specialists in several families, most of the material has now been identified, enabling 975 species to be recorded. Both higher plant and fungus feeders are well represented. Among these were 11 currently afforded Red Data Book status and a further 43 "notable" species; a range of these as well as some species new to Britain were exhibited at the 1993 Annual Exhibition and are listed in the Exhibition report. Only a few other species are therefore mentioned here.

A dolichopodid *Nematoproctus distendens* (Meig.), which is found by woodland streams in the New Forest and otherwise recorded in Britain only from one site in Glos., was found in June and July around a muddy creek (Fig. 5) in Sandford Copse. *Eustalomyia hilaris* (Fall.) (Anthomyiidae), associated with Sphecidae nesting in rotten wood, was found in the carr at the south end of Mortimer's Meadow; most British records are from the Thames valley. *Volucella inanis* (L.) (Syrphidae) was observed in several areas during August. The aquatic Stratiomyidae have not been found but we know that *Stratiomys potamida* (L.) has occurred, as it was photographed by Ron Boyce on umbels near White Swan Lake on 30.vii.1985; it may have disappeared during the drought years.

Fig. 2. Mungell's Pond.

Fig. 3. West shore of Black Swan Lake, with old oaks in hedge behind.

Hymenoptera. The sawflies were well worked, mainly by Andrew Halstead, with 52 species already recorded. On 18.ix larvae of *Caliroa cerasi* (L.) were found on *Pyracantha* planted by the Society's building; on 20.xi.92 larvae had been found on the more regular foodplant cherry. The alder wood wasp, *Xiphydria camelus* (L.) was found on 23.v, near alders by the lakes, and *Hartigia xanthostoma* (Evers.), which mines meadowsweet stems as a larva, on 5.vi.

Little attention was given to the Aculeata in 1993, with only 25 species so far recorded, but queens of *Dolichovespula media* (Retz.) were noted between Mungell's Pond and the hedge south of Black Swan Lake on 8.v (when one was caught by Roger Leeke) and again by me on 23.v. Most other species were determined by John Felton; these included three "notable" species: *Priocnemis hyalinata* (F.) (Pompilidae) and *Lestiphorus bicinctus* (Rossi) (Sphecidae) were found on Mortimer's Meadow on 31.vii, *Lasioglossum malachura* (Kirby) (Halictidae) near Mungell's Pond on 13.ix.

Seven species of gall wasp (two on rose, five on oak) were recorded on 20.ix by Ron Boyce and Andrew Halstead.

Neuroptera. Nine species were recorded, all determined by Colin Plant. *Micromus variegatus* (L.), a local grassland and scrub species has been recorded on both September field meetings and in July. *Sisyra fuscata* (F.) was found near Middle Marsh on 18.ix.

Homoptera. A nymph of *Ledra aurita* (L.) was found by the river on 20.ix by Roger Hawkins. *Cercopis vulnerata* Ill. was frequent in the park on 15.v.

Heteroptera. There are records of 31 species, mostly recorded by Roger Hawkins on 20.ix. Seven species of shield bug have been found including *Eysarcoris fabricii* (Kirkaldy) near White Swan Lake on 23.v and *Aelia acuminata* (L.) is frequent in the less disturbed areas of grassland. *Coreus marginatus* (L.) is often frequent on coarse herbage from July to September.

Odonata. There is a list of 22 species found in the park in the 1985 booklet. Eight species were recorded on the field meetings; the weather was wet on the day of the dragonfly workshop but observation of settled specimens nevertheless took place. *Calopteryx splendens* (Harris) was conspicuous by the river on 15.v. *Aeshna mixta* Lat. was frequent by the lakes during the September meetings.

Orthoptera. Five species have been recorded, including *Tetrix subulata* (L.) by Mungell's Pond on 20.ix and *Pholidoptera griseoaptera* (De Geer) elsewhere on the same day.

Coleoptera. There are still relatively few beetle records, although some species of interest occurred. *Anthocomus rufus* (Herbst) (Melyridae) was found by Mungell's Pond on the September meetings. The cardinal beetle *Pyrochroa serraticornis* (Scop.) was frequent on the riverbank on the May meeting. A *Platycis* species (Lycidae) was noted on low foliage in the hedge south of Black Swan Lake on 17.vi, the date suggests the little known *P. cosnardi* but this will require confirmation. Several species of Cerambycidae were noted, including *Phytoecia cylindrica* (L.), which develops in umbel stems, found on cow parsley flowers near the river on 15.v and other parts of the park later in May, and *Leptura livida* F. was generally frequent at umbels in June. Andrew Halstead observed exit holes of *Agrilus pannonicus* P. & M. (Buprestidae) in a moribund oak on Mortimer's Meadow on 13.vi and he also recorded the weevil *Notaris scirpi* F. by White Swan Lake and Mungell's Pond in June and August.

Araneae. Martin Askins recorded adults of 20 species and less determinate immatures of several others on 20.ix.92. A further 10 species were added in 1993 but knowledge of the spiders is still at a very early stage.

Habitats in the park. The accompanying map (Fig. 1) indicates the distribution of the principal habitat types (the areas described below are indicated by numbers on the map). The park is dominated today by a series of lakes which are

Fig. 4. River Loddon, looking north from bridge in Park.

Fig. 5. Sandford Copse, *Nematoproctus* creek (parallel with river at north end).

Fig. 6. Sandford Copse, Loddon Lilies in may.

Fig. 7. Mortimer's Meadows, near river at south end, looking north west to wooded area.

flooded gravel pits, but there are a number of older features, principally the river Loddon with many old alders on its banks and the hedges between the lakes which include many mature oaks. Most parts of the park have produced some insects of interest but several areas have been identified as of particular significance.

Mungell's Pond, which is the nearest wetland area to the society's building, supports a larger variety of insects than any area of comparable extent in the park. The open pond margins are dominated by *Typha* beds but there is a good range of marsh plants and an adjacent area of sallow carr grading into drier scrub and grassland. This area has been recently colonized but provides a valuable link to the hedges south of Black Swan Lake. Mungell's Meadow (2) is an adjoining enclosed area grazed by sheep, which was dominated by ox-eye daisy in the summer of 1993.

The mature hedges south of Black Swan Lake (3) and to a lesser extent those between the lakes (4) (Fig. 3) comprise two hedgebanks separated by a largely overgrown trackway (Mortimer's Way) and provide excellent shelter for shade-loving species and those associated with dead wood and fungi. Their continued existence has undoubtedly enabled many species to survive since before the days of gravel extraction, and a good number of woodland species have been found in these areas.

The several lakes have a great variety of marginal vegetation and have been colonized by many aquatic and plant-feeding species of insects, but relatively few "notable" species have been found by comparison with Mungell's Pond, suggesting that its wetland habitats are more ancient in origin. The reedbeds at the north end of White Swan Lake are, however, of some interest. Sandford Lake and Lavell's Lake at the north end of the Park are conservation areas for waterfowl.

Middle Marsh (5) is an area of tall mixed marsh vegetation with grass tussocks, surrounded by carr and hedges and bordering a small pond. Again few "notable" species have been found and much of the area was mown in September 1993 with the intention of encouraging the marsh orchids which otherwise occur in the park only around Mungell's Pond.

South of Sandford Lake (6) is an area of varied scrub and grassland habitats with a rich flora and a good range of insects requiring drier grassland have been found there.

The banks of the River Loddon (Fig. 4) are fringed by mature trees along the greater part of both banks and there are some broader areas of woodland, on the east side near Heron's Water (7) where a good concentration of dead wood and fungus feeding species has been found, and more especially on the west side where there is an area of carr at the south end and the more extensive Sandford Copse at the north end.

Sandford Copse (Fig. 5) comprises alderwood (8) near the river, including an area (outside the park boundary, near Sandford Mill) with SSSI status because of its large stand of loddon lily (*Leucojum aestivum* L.) (Fig. 6), and hazel coppice (9) dominated by bluebells in the spring on the higher ground near Bader Way. Bader Way Copse (10) on the other side of the road is a more extensive area of uncoppiced hazel; most of the hazel in Sandford Copse was coppiced during 1993. The alderwood areas have proved productive of uncommon Diptera especially near the river where a good amount of dead wood is present.

The entire area west of the river south of Sandford Copse is described as Mortimer's Meadows but is quite diverse. There is a field at the north end which develops tall marsh vegetation during the summer but has been extensively invaded by nettles, due to the lowering of the water table in the area following the construction of the housing estate on the other side of Bader Way. This field produced some good species early in the year but was mown in September 1993.

Where the river is closest to Bader Way there are some areas of herb rich grassland between a hedge and the road, where a high diversity of insects is present in a relatively

small area (12). The central areas include some planted copses of sallows and other trees and provide shelter for many insects. The greater part of the open areas was mown for hay in July 1993 and has produced little of interest, but an unmown fringe (14) dominated by thistles near the river supports a good number of insects.

At the south end of Mortimer's Meadows, between the small area of carr and drier woodland (15) and the river, there is an area of varied tall marsh vegetation, which has a diverse flora (16) (Fig. 7). Although this area too becomes dry in the summer, it has retained a good range of insects from the time when all the fields adjoining the river were grazed watermeadows and the adjoining carr provides shelter for woodland species.

The higher plants of the park were surveyed in 1993, augmenting an earlier list drawn up 10 years ago and there are plant lists for all the different areas, about 300 species having been recorded altogether. This remarkable diversity of habitats has enabled the large number of Diptera species found to survive despite all the changes in land use and the public pressure that is currently inevitable. The Country Park authorities agreed to take invertebrate conservation into account in the management plan being drawn up during 1994 and it is hoped that the next few years will see knowledge of all groups of insects in the area significantly increasing.

BENHS FIELD MEETING

Dinton Pastures, Berkshire, 21 May 1994

Leader: **David Young**. No doubt the meteorological records for 1994 will record yet another cold and wet spring, which was typified by the date chosen for this field meeting. Perversely the heavy rain and strong wind both stopped during the early evening and, with the temperature not unreasonable, five m.v. traps were run in the general area of the fishermen's car park on the western side of the country park. Unfortunately heavy and persistent rain returned soon after dark and the three members, and two guests, present had to work hard for the modest list of Lepidoptera species recorded.

Despite soaking wet foliage an attempt was made to beat for larvae. This effort quickly produced a fully grown larva of *Strymonidia w-album* (Knoch) beaten from hedgerow elm (*Ulmus* sp.), an interesting record both in terms of species recorded at Dinton Pastures and in view of the article by Peter Baker on the status of this species in north-west Surrey (*Br. J. Ent. Nat. Hist.* 1994; 7: 25). Other larvae recorded included *Operophtera brumata* (L.), *Apocheima pilosaria* (D. & S.), *Erannis defoliaria* (Cl.) and *Cosmia trapezina* (L.).

Moths recorded at m.v. light were: *Hepialus lupulinus* (L.), *Adela reaumurella* (L.), *Elachista argentella* (Cl.), *Esperia sulphurella* (F.), *Syndemis musculana* (Hübn.), *Olethreutes lacunana* (D. & S), *Epiblema cynosbatella* (L.), *Xanthorhoe spadicearia* (D. & S), *Xanthorhoe ferrugata* (Cl.), *Xanthorhoe montanata* (D. & S.), *Chloroclysta truncata* (Hufn.), *Thera obeliscata* (Hübn.), *Plagodis dolabraria* (L.), *Opisthograptis luteolata* (L.), *Biston betularia* (L.), *Cabera exanthemata* (Scop.), *Lomographa temerata* (D. & S.), *Mimas tiliae* (L.), *Laothoe populi* (L.), *Furcula furcula* (Cl.), *Pterostoma palpina* (Cl.), *Agrotis puta* (Hübn.), *Ochropleura plecta* (L.), *Diarsia rubi* (View), *Charancyca trigrammica* (Hufn.).

THE 1992 PRESIDENTIAL ADDRESS—PART 1. REPORT

JOHN MUGGLETON

30 Penton Road, Staines, Middlesex TW18 2LD.

My predecessor welcomed me to the chair with the words that the post of president was much less arduous than that of the honorary secretary. I can confirm that he was correct and, indeed, I now look forward to the even less arduous post of vice-president and, for the first time in many years, to be able to attend council meetings without having to say anything or take notes. Of course the work of the president is made much easier not only by those officials we have just re-elected, but also by the unelected officers whose names do not appear on the annual general meeting notice but who have some difficult jobs—Geoff Burton, the assistant treasurer; Andrew Godfrey, the membership secretary; David Young, the distribution secretary; Ian McLean, the indoor meetings secretary and Roger Morris, the field meetings secretary. All have important jobs, I would ask you to express our appreciation in the usual manner.

I now have the sad task of mentioning those of our members who have passed away during the year. The deaths of seven members and one former member have been brought to our attention during the year.

Mr I. BOLT joined the Society in 1990; he was an active lepidopterist who did much to found the Somerset Moth Group.

Mr L. E. COUCHMAN was, at the time of his death, the "father of the society", having joined on 12 January 1922. He was a lepidopterist and lived at Hampstead at the time he joined the society. He attended the society's meetings and was an occasional exhibitor. By 1947 he had moved to Tasmania where he remained until his death. Alas, I have been unable to find out any more about him.

Mr L. A. CRAM had been a member of the society for only a month when he died in February 1992.

Mr K. G. W. EVANS joined the Society in 1969 and will be remembered by many members for his work as exhibition secretary. He was an enthusiastic lepidopterist who was particularly interested in the macrolepidoptera of the Croydon area and who, with his son Laurie, published *A survey of the macrolepidoptera of Croydon and north-east Surrey* in 1973. He was an active member of the Croydon Natural History Society and was their president from 1975 to 1977. He published a number of notes in our *Proceedings* and in the *Entomologist's Record*.

Mr. J. A. C. GREENWOOD joined the society in 1958 and was president in 1966. He was a lepidopterist who was also interested in general natural history and was a regular exhibitor at indoor meetings. He also led field meetings for the society. He will be remembered by many as a regular contributor, with his wife Dorothy, to the *Entomologist's Record* with notes and accounts of collecting trips in Europe (and elsewhere) from the early 1960s to the 1980s. He was, at the time of his retirement, chief general manager of the Sun Alliance Insurance Group and gave the society much useful advice on financial and insurance matters. He was a member of the society's finance committee at the time he died.

Mr D. A. NEAL joined the society in 1990 and was interested in the lepidoptera. I am afraid I have not been able to find out any more about him.

Mr L. H. NEWMAN was not a member at the time he died but was a member from 1926 to 1936 and from 1945 to the early 1960s. He will be remembered as the proprietor, in succession to his father L. W. Newman, of the butterfly farm at Bexley in Kent, and by my generation for his participation in the BBC children's hour

programme *Nature Parliament* under the chairmanship of Derek McCulloch (Uncle Mac). He wrote many popular books and articles on butterflies, moths and natural history and an autobiography, *Living with butterflies*. He retired from the butterfly farm in 1966.

Mr E. H. Wild first joined the society in 1946 and was a member of the society's council from 1949 to 1951. After a lapse in membership he rejoined the society in 1971 and was honorary secretary from 1978 to 1980. Starting out as a macrolepidopterist he turned his attention to the microlepidoptera in the late 1970s and was able to record a species new to Britain, *Elachista littoricola*. He published many entomological notes and his great sense of humour led him to publish a short series in the *Entomologist's Record* on "mothmanship" in 1989 and 1990.

The year 1992 was the 121st of the society's existence and an *annus mirabilis*. For the first time in its history the society has a permanent base for its library and collections. Accommodation or, more correctly, its termination has always been a worry to the society's council; we can now relax and plan ahead for the next 70 years. It is inevitable that the society will change as a result, but change, properly managed, is no bad thing. New traditions can now be set up and the best of the old retained. To this end I have volunteered in my "retirement" to redraft the society's bye-laws with particular reference to the section on membership. This is a very difficult society to join!

The first indications are that the move to Dinton Pastures has been a success. An initial field meeting at an unpromising time in the autumn produced an above average species list and the weekend openings are attracting a good attendance, including members from further afield who we otherwise used only to see at the annual exhibition. Both the librarian and curator are already complaining of lack of space; with foresight a larger building would have been possible. Alas the roof space is taken up with a problematic air conditioning plant which is still adding to the curator's worries. As you will remember the building was made possible by a generous bequest from our late member Edward Pelham-Clinton, 10th Duke of Newcastle. The building will be named the Pelham-Clinton Building in his memory and a plaque will be mounted inside to record his bequest and the several others that have helped to put the society on a firm financial footing.

Our thanks must go to our present treasurer and his predecessor, Col. D. H. Sterling, for their excellent management of the society's finances and investments. As you will have heard from the treasurer's report the society is now in a firm financial position. When the council agonized over whether to proceed with the Pelham-Clinton building some saw financial ruin ahead and all of us had our doubts. However the economic depression, which has brought hardship to many, has benefited the society which had a large sum of money to invest at a time when interest rates were high. A consequence of this is that the society must now decide how best to use its surplus funds for the benefit of entomology, something which, as a charity, we must consider very seriously indeed. I hope that future councils will rise to this challenge.

The society's journal under the stewardship of our editor, Richard Jones, who has occasionally boldly dared to go where no Editor before him has gone, has become an excellent publication. It remains our only link with many members and their continuing membership is a sign of its value. It is also an excellent ambassador for the society in the entomological world. I wish it and the society continuing success.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

INSTRUCTIONS TO AUTHORS

General. Contributions must be double-spaced on one side only on A4 paper with 3-cm margins either side to facilitate marking up. Layout should follow that of the journal, but apart from underlining scientific names, no marks should be made to define typeface.

Two copies of typescripts and figures are required, the second copy can be a photocopy. Authors who have prepared their article on word processor are invited to supply a disk also.

Nomenclature. Use the most up-to-date nomenclature available. After first use of a specific Latin name give the author's name; use parentheses only if required according to the rules of nomenclature. This should apply not only to insect names, but also to the names of plants, non-insect invertebrates and other animals.

Figures and tables. Line figures and half-tones are accepted. Size of lettering, thickness of lines and density of shading, stippling and hatching must take into account likely reduction in size to fit appropriately into the journal page size. Illustrations must be of good quality, however lettering can be typeset if necessary; indicate requirements on a duplicate figure. Colour illustrations may be available, please contact the editor. Tables should be prepared on separate sheets; avoid vertical rules, use horizontal rules sparingly.

References. In the text, references should give author and year, (e.g. Allan, 1947); multiple references (e.g. Kendall, 1982; Smith, 1989; Baker, 1994) should be listed in date order. But references should be listed in alphabet order at the end of the article. Book titles take only an initial capital letter. Journal titles are abbreviated in the style of the World List, but with each word taking an initial capital. Examples:

Allan, P. B. M. 1947. *A moth-hunter's gossip.* 2nd edn, Watkins and Doncaster, London, p. 149.

Baker, P. 1994. The modified status of *Strymonidia w-album* (Knoch) (Lepidoptera: Lycaenidae) in north west Surrey. *Br. J. Ent. Nat. Hist.* 7: 25–26.

Kendall, P. 1982. *Bromius obscurus* (L.) in Britain (Col., Chrysomelidae). *Entomologist's Mon. Mag.* **117** (1981): 233–234.

Pratt, C. R. & Emmet, A. M. 1989. *Polygonia.* In: Emmet, A. M. & Heath, J. (Eds). *The moths and butterflies of Great Britain and Ireland.* Harley Books, Colchester, Vol. 7, Part 1, pp. 212–215.

Smith, K. G. V. 1989. An introduction to the immature stages of British flies: Diptera larvae, with notes on eggs, puparia and pupae. *Handbk Ident. Br. Insects* **10(14)**: 1–280

Stubbs, A. E. 1987. *Oxycera dives.* In: Shirt, D. B. (Ed.). *British red data books: 2. Insects.* Nature Conservancy Council, Peterborough, pp. 304–305.

Stubbs, A. E. & Falk, S. J. 1983. *British hoverflies: an illustrated identification guide.* BENHS, London, pp. 191–192.

West, B. K. 1994. The time of appearance of *Lacanobia oleracea* L. (Lep.: Noctuidae) in the British Isles. *Entomologist's Rec. J. Var.* **106**: 81–84.

Offprints. Authors of main articles receive 25 free offprints taken directly from the journal. These may contain extraneous matter such as short communications or book reviews used as 'fillers'. Extra copies may be ordered when proofs are returned.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this fund for the promotion of entomological research with particular emphasis on:

(a) leaf-miners
(b) Diptera, particularly Tephritidae and Agromyzidae
(c) Lepidoptera, particularly Microlepidoptera
(d) general entomology

in the above order of preference having regard to the suitability of applicants and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary to fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are unlikely to exceed £600 in 1994/95.

Applicants should send six copies, if possible, of a statement of their qualifications, of their plan of work, and of the precise objects and amount for which an award is sought, to Dr M. J. Scoble, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5DB, as soon as possible and not later than 30 September 1994.

Applications are also invited from persons wishing to borrow the Wild M3 stereomiscroscope and fibre optics illuminator bequeathed to the fund by the late Edward Pelham-Clinton, 10th Duke of Newcastle. Loan of this equipment will be made for a period of up to six months in the first instance.

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Cover illustration: The weevil *Dryophthorus corticalis* (Payk.), from Windsor Forest, Berkshire, its only known British site. This wood-feeding beetle is given Red Data Book status 1 (endangered) and is accorded saproxylic indicator status grade 1 in Harding, P. T. and Rose, F. 1986. *Pasture woodlands in lowland Britain*. Photo: R. A. Jones.

SUPPLEMENT TO BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Invertebrates in the landscape:

invertebrate recording in site evaluation and countryside monitoring

Proceedings of the National Federation for Biological Recording
Annual Conference held at
the University of Sussex 5th July 1991

Supplement edited by Paul T. Harding

Production of this supplement to *British Journal of Entomology and Natural History* was made possible by a grant from the National Federation for Biological Recording.

PREFACE

Invertebrates have recently gained in importance in the evaluation of sites and the monitoring of changes in the countryside. There are still many difficulties in using invertebrates as indicators of site quality and environmental changes, but, as the papers in this publication show, considerable progress has been made in recent years.

Central to this progress have been two closely allied developments; the national recording schemes for invertebrates, organized in collaboration with the Biological Records Centre, and the Invertebrate Site Register. Also, the establishment of local records centres, most of which are based at museums, is having a significant effect on the availability of authoritative information on invertebrates at county and district levels.

Vascular plants and birds are likely to remain the first priority for site evaluation and environmental monitoring for many years to come. However, there are some ecological features for which invertebrates are already acknowledged to be sensitive and reliable indicators, for example relic forest areas with old trees and lowland wetlands.

The difficulties of using invertebrates include the sheer number of species, the taxonomic problems of many groups, the lack of experienced taxonomists and field workers and the scarcity of truly replicable sampling techniques for many groups or biotopes. Although the speakers at the 1991 Annual Conference of the National Federation for Biological Recording could only touch on many of these topics, the published account of their presentations provides up-to-date reviews and plenty of food for thought.

The 1991 conference was organized, at short notice, by Derek Lott and Alex Tait. I am grateful to the authors for responding, more than a year after the conference, to my request, on behalf of NFBR, to provide a written version of their presentation. I am also grateful to Julie Gaunt for preparation of the camera ready copy for publication.

Paul T. Harding
Biological Records Centre

Glossary of abbreviations:
BBCS - British Butterfly Conservation Society (now Butterfly Conservation);
BRC - Biological Records Centre (Monks Wood);
DC - Development Control;
ISR - Invertebrate Site Register;
JNCC - Joint Nature Conservation Committee;
LNR - Local Nature Reserve;
LRC - Local Records Centre;
NCC - Nature Conservancy Council;
NNR - National Nature Reserve;
RDB - Red Data Book;
RSPB - Royal Society for the Protection of Birds;
SSSI - Site of Special Scientific Interest;
UDP - Unitary Development Plans.

THE INVERTEBRATE SITE REGISTER — OBJECTIVES AND ACHIEVEMENTS

STUART G. BALL

Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough PE1 1JY.

INTRODUCTION

Background

Information on the status, distribution and biology of species underpins much of nature conservation practice. The unavailability of such information for invertebrates has been the main cause of their relative neglect by conservation bodies. A large majority of practitioners in the statutory conservation agencies and voluntary bodies have little or no expertise in invertebrates. If they are to consider invertebrates when selecting sites for conservation and making decisions on their management, it is essential that the necessary information is available in an immediately usable form. In collating information from a great many diverse sources and interpreting and disseminating it, the Invertebrate Site Register (ISR) attempts to fill this information gap. The inclusion of unpublished information from amateur specialists is important in this respect as it would not otherwise be available.

The ISR is the largest and longest running in-house project concerning terrestrial and freshwater invertebrates undertaken by the Nature Conservancy Council (NCC) and its successor bodies (the Joint Nature Conservation Committee, English Nature, Scottish Natural Heritage and the Countryside Council for Wales). It started in 1980 with two contract personnel based in England and one each in Scotland and Wales. From 1983 onwards the whole team was based centrally in the Chief Scientist's Directorate of the NCC's Great Britain Headquarters. A substantial increase in personnel occurred in 1985 and, from mid-1986, computerization of the database became a central issue. When NCC was split up in 1991, the ISR moved to the Species Conservation Branch of JNCC.

Objectives

The objectives of the ISR were defined as follows by Palmer and Ball (1992):

1 to identify, document and evaluate sites of importance for the conservation of terrestrial and freshwater invertebrates in Great Britain, in order to provide national and local overviews of the resource and set this in a European context;

2 to provide a clear statement on the invertebrate fauna of individual sites, which can be used to strengthen the scientific basis of site defence and management planning, with the aim of retaining this fauna;

3 to maintain up-to-date statements on the national and regional status, ecology and conservation of British invertebrate species;

4 to contribute to the production of Red Data Books, and revision of Schedule 5 of the Wildlife and Countryside Act (1981) and implementation of the requirements of the EC Habitats and Species Directive;

5 to increase liaison between invertebrate zoologists and staff of the conservation agencies and to facilitate the interchange of advice and information, particularly so that future research and survey effort can be encouraged where it is most needed;
6 to supply progress reports on invertebrate conservation to invertebrate zoologists and other interested people.

Related projects on invertebrates

Other projects have been funded separately from the ISR, but complement its objectives:
1 the *ENTSCAPE entomological bibliography* — a computerized bibliography of the British national and regional entomological literature from 1930, with keywords covering taxonomic group, geographical area and subject;
2 the publication of *Red Data Books* on invertebrates.

METHODS

Information has been collated from many sources including published literature, museum collections, national and local biological record centres and the files of statutory conservation agencies and voluntary bodies. A special effort has been made to involve amateur specialists and to tap their considerable knowledge and experience, which are often unpublished.

Two main types of report have been produced:
1 *National species group reviews.* These cover a taxonomic group and identify the scarcer species. Information on the status, distribution, biology and conservation management requirements of these species is collated and eventually published in the form of data sheets.
2 *County ISR reports.* These cover a geographical area based on modern English and Welsh counties and Scottish regions, but broken down into smaller units in the case of larger counties or regions. Inventories of scarcer species are collated for conservation sites (SSSIs, NNRs, County Wildlife Trust and RSPB reserves, LNRs, etc.) and for sites which local naturalists consider significant.

The ISR database

One of the features of the ISR project is that the information collected to assess sites and species is closely interlinked. A relational database is the obvious way to organize the data so that they may be examined in terms of both species distribution and the occurrence of species at a location. Storage of ISR information in a relational database began in 1986.

Assessment of species statuses and the production of data sheets

Definitions of and the criteria for the various status categories are given in the Appendix. The method by which statuses are allocated is as follows. A checklist is annotated with statuses suggested by distribution maps, if available, or by taxonomic works such as the Royal Entomological Society *Handbooks for the Identification of British Insects.* This provisional list is circulated to specialists, both professional and amateur, for comment. A revised list is produced, based on these initial comments, and is used as a basis for further research. Museum collections are visited, a more extensive literature search is made with the help of ENTSCAPE and data on distribution and biology are abstracted for each of the scarcer species. This process usually results in adjustments to the preliminary statuses. Data sheets are then compiled by collating information under headings such as *Distribution*, *Habitat and Ecology*, *Status*, *Threats*, and *Management*

and Conservation. Finally, the data sheets are sent to appropriate specialists for comment and correction before publication.

Production of ISR county reports

Naturalists resident in the relevant area are contacted using membership lists from local and national societies, and contact lists maintained by local records centres and regional offices of the country agencies. They are asked to identify sites that they consider to be of importance and to indicate what they have found there (the use of sketch maps to locate features of particular interest is encouraged). Information is also sought in the literature (accessed via ENTSCAPE), the files of the regional offices of the country agencies and voluntary bodies, national and local biological record centres and the records and collections of specialists. A summary sheet is compiled for each site (Figure 1) indicating what recording has been carried out and commenting on management issues, together with a list of the scarcer species that have been found there.

Site evaluation

The importance of sites is evaluated on a four-point scale:
A nationally important;
B regionally important (equivalent to a recommendation that the site should be considered for SSSI status);
C potentially important, sites which may rate A or B, but are not well enough known to judge — amounts to a recommendation for further survey;
D no more than locally important.

Many sites remain ungraded. These are localities about which there is minimal information or only old information.

The site evaluation process is the result of expert judgement by an experienced invertebrate zoologist, on the basis of the available information. This evaluation is assessed in relation to these questions

1 *How well recorded is it?* Sites which have received very limited recording effort cannot be graded higher than 'C'. Reasonably well recorded sites (those which have been visited by several specialists over more than one season, using several different collecting techniques) can be considered further. However, many sites are exceptionally well recorded because they happen to be convenient for specialists to visit (for example, the grounds of field stations). Such sites require downgrading if they have no special features beyond intense recording effort.

2 *What are the special features of the site?* One of the main features which can be readily assessed is the presence of an assemblage of scarcer species associated with the habitats present on the site. It is, however, necessary to apply critical judgement to the species list to decide whether the site is likely to support viable resident populations. There is rarely direct proof of breeding, or estimates of population size, but it is often possible to gain some insight by considering what is known of the biology, distribution and habitat requirements of each species. For example, is the location within the known ranges of the species and does it provide the necessary niches? If there are repeated records of a species, this provides circumstantial evidence that it is resident, whilst an isolated record of a species in a well worked group might suggest that it is a vagrant. If a site is reasonably well recorded, but has no special features, a 'D' grading would be justified.

3 *Are the special features adequately represented on conservation sites in the area?* NCC has stated: 'The primary objective of nature conservation is to ensure that the natural heritage of wild fauna and flora and geological and physiographic features remains as large and diverse as possible' (NCC, 1984) and that 'The biological SSSI series is

Site number 71/3

INVERTEBRATE SITE REGISTER
MASTER FORM

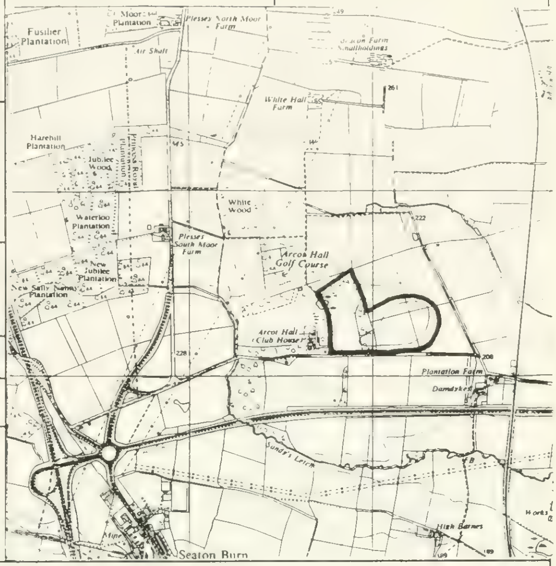
Name(s)
ARCOT HALL
DAMDYKES MARSH

County(s)
Northumberland

Grid. Ref. NZ2475

Grade B

Status
pSSSI



Site description - Habitat

A subsidence pond in an area of unimproved, damp pasture with associated hedgerows and patches of undisturbed deciduous woodland with an abundance of dead wood. The richest areas are west of the main pond where there is herb rich, damp meadow with a series of small pools choked with a variety of emergent vegetation.

Invertebrate Interest - Coverage

Jim Parrack has been visiting this site recently and provided both Diptera and Lepidoptera records. Tim Melling has recorded the Least Minor (RDB3) at one of its few non-coastal sites in the region and Mick Eyre's samples of the waterbeetle fauna resulted in the longest species list for a site in the region (33 species) including <u>Agabus unguicularis</u>.

Comments - Conservation

The site is adjacent to the golf club clubhouse and has been threatened by a proposal to build a golf centre and tidy up and landscape the area generally.

Figure 1. A "master form" from the ISR report for Northumberland.

intended to form a national network of areas representing in total those parts of Great Britain in which the features of nature, and especially those of greatest value to wildlife conservation, are most highly concentrated or of highest quality' (NCC, 1989). Thus, if particular assemblages of scarcer invertebrates are not adequately represented at existing protected sites in a county, region or country this justifies grading the best examples in a country or region at 'B' and the best examples nationally at 'A'. In nearly all cases, well recorded sites are likely to contain some species which are not recorded elsewhere in the region or country, but sites are rarely scheduled as SSSI on the basis of individual rare species. According to the *Guidelines for the selection of biological SSSIs* (NCC, 1989) only sites with populations of species listed in Schedule 5 of the Wildlife and Countryside Act 1981 would qualify as candidates for selection as SSSIs on this basis, except in the case of some species of butterfly and dragonfly where more specific guidelines are given. Apart from these few species which are subject to specific guidelines, Red Data Book and other scarce species 'should be conserved as part of a rich faunal assemblage'.

RESULTS AND DISCUSSION — THE EXTENT TO WHICH OBJECTIVES ARE BEING MET

Objective 1 — to document and evaluate important sites

County ISR reports document and evaluate important sites on a county-by-county basis. Reports have been prepared for all counties in England and Wales and regions in Scotland. Figure 1 shows an example of a 'master form' for a site in the report for Northumberland. Earlier ISR county reports, produced between 1981 and 1985, were classified as 'confidential' and are therefore not available outside the statutory agencies. From 1985 onwards information was collected on the basis that it was not confidential unless specified by the originator. County reports were subsequently produced in two versions, a 'confidential' version for internal use only, and a 'non-confidential' version, which was distributed to other organization, including museums, local record centres, county wildlife trusts, RSPB, the National Trust and, in some cases local authorities and utilities such as water companies. Two reports (West Midlands and Warwickshire) were completed, but were not produced in hard copy form.

Objective 2 — to provide a statement of the fauna of sites for use in site selection, defence and management

ISR county reports include a list of species from each site in the area covered by the report and a 'single site report' can be produced from the ISR database on request. Reports may be annotated with a brief account of the status, distribution and biology of each species (Figure 2). Lists of this type have been provided to reserve managers and other staff in both the country agencies and voluntary bodies, for use in site management plans and in site defence, including public inquiries. It is also possible to interrogate the database to provide information on where else particular species, or assemblages of species, have been recorded in a county, region or country. This type of analysis, which highlights the special interest of a site, has proved effective in the defence of sites.

Site selection

Colleagues working at the regional offices of NCC and its successor bodies have responsibility for scheduling SSSIs. Recommendations from the ISR have been taken seriously and a number of sites have been scheduled directly as a result of 'A' or 'B' grading in the ISR, although, more typically, the invertebrates are just one element of the interest of a site. When a site is proposed as a candidate for SSSI status, more detailed work is necessary to determine the special interest of the site and define its boundaries. This

ISR database Glasbury Shingle Beds (SO1840) 14 AUG 1992

pRDB 2

Negastrius sabulicola (Boheman,1853) COL:Elateridae 1986 11
Listed in the published Red Data Books as RDB 3
Small click beetle living among shingle on northern and western rivers. Very local.

Tachydromia acklandi Chvala DIP:Empididae 1986 6
Listed in the published Red Data Books as RDB 1
Small fly running rapidly over the surface of mud at the side of upland rivers. Very rare, with records only from a few sites in Scotland and one in Wales. More realistically should be considered RDB2.

RDB 3

Bidessus minutissimus (Germar,1824) COL:Dytiscidae 1987 6
-- additional record -- 1986 9
A very small black and yellow water beetle. Found in sandy shallows of rivers and at the margins of lakes e.g. Slapton Ley, Devon. Very rare, though recorded from England, Scotland and Wales with all records being in the west. Only recently noted in the last named county.

Na

Fleutiauxellus maritimus (Curtis,1840) COL:Elateridae 1986 11
Small black click beetle living among shingle on river banks (not coastal as the name would suggest). Northern and western species. Very local.

Georissus crenulatus (Rossi,1794) COL:Hydrophilidae 1986 9
Small water beetle found in trickles and flushes in muddy conditions. Widespread but very local.

Hydraena rufipes Curtis,1830 COL:Hydraenidae 1987 6
-- additional record -- 1986 10
A small black water beetle, most often recorded from amongst moss and on stones in swift-flowing rivers; also known from fen conditions in the north.

Perileptus areolatus (Creutzer,1799) COL:Carabidae 1986 8
Small (2.5mm) dark brown ground beetle living among riverine shingle, often at depth within the shingle. Western species, SW peninsula, Wales & Marches, Lancs, SW Scotland. Apparently very local but secretive habits may lead to under-recording.

Philonthus atratus (Gravenhorst,1802) COL:Staphylinidae 1986 10
Predatory metallic blue or green/black rove beetle found in damp litter etc. England N to Yorks, very local and rare.

Thalassophilus longicornis (Sturm,1825) COL:Carabidae 1986 9
Small (3.5-4mm) flattened red/brown ground beetle living among riverine shingle. North western species. Wales & Marches, Cumbria & W Scotland. Rare.

Notable/Nb

Bembidion fluviatile Dejean,1831 COL:Carabidae 1986 9
5.5-6.5 mm long black ground beetle with 4 orange spots, living on fine sands and mud by northern & western rivers. Wales, N England & Scotland. Always very local.

[Further species listed here ....]

28 species listed
Invertebrate Index = 1200

Sources of records:

1. Bowestead, Mr S. 48 Grimshaw Lane, Ormskirk, Lancs, Tel. 0695 73874.
2. Carter, I.C. 1 Waterfield Close, Cheltenham.
3. Drane, Mr A.B. 14 Rockingham Road, Cottingham, Market Harborough, Leics.
4. Eccles, Mr T. 59 Linkstor Road, Liverpool, Tel. 051-4282665.
5. Henson, Mr H.E. 36 Thornleigh Drive, Orton Longueville, Peterborough, PE2 0AL.
6. Hodge, Mr P.J. 8 Harvard Road, Ringmer, Lewes, East Sussex.
7. Hyman, Dr P. Luton Museum, Wardown Park, Luton, Beds, LU2 7HA.
8. Johnson, Mr C. Entomology Dept, Manchester Museum, The University, Oxford Road, Manchester, M13 9PL.
9. Key, Dr R.S. Species Branch, English Nature, Northminster House, Peterborough PE1 2TU.
10. Lott, Mr D. Natural History Dept, Leicester Museum and Art Gallery, 96 New Walk, Leicester, LE1 6TD.
11. Mendel, Mr H. Suffolk Biological Records Centre, The Museum, Ipswich, Suffolk, IP1 3QH.

Figure 2. Part of an annotated species list for a site.

usually requires detailed survey work and, before NCC was split up, ISR personnel often assisted regional colleagues by identifying suitable specialists to carry out such work and arranged funding for small contracts to support the necessary work. In drawing up the SSSI schedule, which includes a statement of the special interest of the site, ISR personnel also assisted with drafting paragraphs on the invertebrate interest. Since the break up of NCC, these tasks have been undertaken by invertebrate zoologists in the headquarters (and some regions) of the country agencies. ISR personnel are no longer directly involved with site casework of this type, although data held by the ISR continue to provide a basis for such help and advice.

Examples of sites identified by the ISR include those with assemblages of invertebrates associated with riverine shingles, which were found to be poorly represented in the SSSI series in northern England and the Scottish Borders. This led directly to the scheduling of two SSSIs in Northumberland. A further site in Northumberland and one in Borders Region are being investigated as candidates for SSSI designation.

Site protection

In justifying the selection of a particular site, it is normally necessary to demonstrate that it is amongst the best representatives of its stated special features. The ISR allows investigation of the occurrence of individual scarce species, or assemblages of species, and the production of reports which demonstrate their occurrence elsewhere in the county, region, or country. Such analyses have proved very effective at public inquiries. For example, substantial input was provided to the public inquiries on Ridham Marshes in Kent and Rainham Marshes in Essex. The inspector's recommendations for Ridham Marshes, announced recently, were in favour of the conservation case.

Site management

To incorporate the requirements of invertebrates in management plans, site managers need to know the requirements of significant species and also the habitat features with which they are associated. Information on the management requirements of particular species and any perceived threats has been a priority whilst compiling data sheets. By collecting inventories of the occurrence of scarcer species on sites, and by providing annotated lists (Figure 2) and data sheets (Figure 3) to site managers, it is possible to provide them with the input they need. For example, the management plan for Moccas Park NNR was recently completed with substantial input from the ISR, which documented the internationally important saproxylic fauna at this site.

Objective 3 — to maintain up to date statements on status and ecology of species

National reviews of species groups have been produced covering a wide range of taxa. These include data sheets for 4140 scarcer British species. An example is shown in Figure 3. A brief paragraph on the status, distribution and biology on over 10 000 species is also held on the database. Figure 2 shows examples of these paragraphs. Early national reviews were, like early ISR county reports, classified as 'confidential' and are not available to outside bodies. They included reviews of non-marine molluscs, Orthoptera, macro-Lepidoptera and micro-Lepidoptera. All recent reviews are published documents and cover spiders (Merrett, 1990), Ephemoptera and Plecoptera (Bratton, 1990), Neuroptera (Kirby, 1991), Trichoptera (Wallace, 1990), Hemiptera (Kirby, 1992a), aculeate Hymenoptera (Falk, 1991a), Diptera (Falk, 1991b) and Coleoptera (Hyman & Parsons, 1992) and pyralid moths (Parsons, 1993). Part 2 of the Diptera and Coleoptera reviews and a revision the macro-Lepidoptera and remaining micro-Lepidoptera reviews are in preparation and a review of sawflies is planned.

TAPHROPELTUS LIMBATUS **RARE**

Order HEMIPTERA Family LYGAEIDAE

Taphropeltus limbatus (Fieber)

Identification Southwood & Leston (1959).

Distribution South Britain, particularly the south-west. The species was first recorded in Britain from Southsea, Hampshire, in 1870, and has since been found in Bewdley Forest, Worcestershire, in 1879; Bowes Park, Middlesex, around the turn of the century; Windsor Forest, Berkshire, in 1933; at least five localities in Dorset, the most recent in 1981; the New Forest, Hampshire, a number of records over several decades to the late 1950s, and two localities in Devon, the Meavy Valley in 1909, and near Dunsford in the 1950s. It appears to be an uncommon south-western species elsewhere in Europe, and is recorded from Spain, Portugal, France and Germany.

Habitat and ecology This species is associated with ants, but the exact nature of the relationship is not clear. Continental workers have linked it with several types of ants, including species as far removed in taxonomy and nest structure as *Myrmica scabrinodis* and *Formica rufa*. Ants leave the bug unmolested, though they attack other species of Heteroptera placed near their nests. If the bugs spend much time within the nests, this might in part explain the rather sporadic and irregular records of the species in Britain, and the apparent lack of consistent habitat preferences. It has been found in wet moss beside a stream, in *Sphagnum*, amongst thick vegetation on chalk downland, beneath a stone on a chalk cliff, amongst sparse vegetation in a derelict garden in a wood, on a dry hedgebank, and "in a sandy place". The food is unknown; members of the subfamily are generally believed to be seed-feeders. It appears to overwinter as an adult. Mating has been observed in May, and oviposition in June. Nymphs in the last instar have been found in early to mid-August, so there is probably one generation per year, maturing in mid- to late August.

Status Very local, but exact status unclear. Records are few, scattered, from a rather wide range of habitats, and usually of only one or two individuals. This would suggest that the species is usually present in small numbers and may easily be overlooked, particularly in the south-west, which is not a well-worked area for Heteroptera.

Threats Uncertain. In the current state of knowledge of the biology of the species it is difficult to determine what factors might be damaging to it. The only common factor linking the recorded habitats seems to be that they are open and unshaded. Loss of such open conditions, particularly as a result of neglect of previously managed sites, may be significant. The Middlesex site was destroyed by urban development many years ago.

Conservation Four records fall certainly or probably within SSSIs: Windsor Forest, Berkshire; New Forest, Hampshire, and the Purbeck Ridge, Dorset. It is difficult to suggest positive conservation measures for the species in the current state of knowledge. More information on the biology and ecology of the species is needed. If it is genuinely a species of sporadic occurrence, associated with a number of ant species, and otherwise with no strong habitat preferences, it may be impossible to suggest overall conservation measures. Management at known sites should aim to retain open conditions: on most sites this may be best achieved by light grazing.

References Butler, E.A. (1923a), Champion, G.C. (1919), Douglas, J.W. (1875a), Groves, E.W. (1965), Massee, A.M. (1955a), Saunders, E. (1892a), Scudder, G.G.E. (1955), Scudder, G.G.E. (1957b), Shirt, D.B., ed. (1987), Southwood, T.R.E. & Leston, D. (1959), Stichel, W. (1955), Thomas, D.C. (1955b), Walker, J.J. (1916).

Figure 3. An example of a data sheet for a species from Kirby (1992a).

Objective 4 — to contribute to Red Data Books and legislation at British and European level

Two Red Data Books have been published covering 'Insects' (Shirt 1987) and 'Invertebrates other than insects' (Bratton, 1991). The ISR was used in preparing advice both for the quinquennial review of the Wildlife and Countryside Act and in commenting upon species proposed for the annexes of the EC Habitats and Species Directive and the Bern Convention (Ball, 1992).

Objective 5 — to increase liaison between invertebrate zoologists and staff of the statutory agencies

Contacts established by personnel working on the ISR have been important in encouraging and directing work on invertebrates towards sites and species of particular interest to the statutory agencies. Many smaller projects have been commissioned from both amateur and professional specialists, to survey particular sites (e.g. parklands in Devon and Leicestershire), or to survey and monitor particular species. Where major gaps in knowledge have been identified, research has been commissioned either in-house or with other institutions such as universities or the Institute of Terrestrial Ecology.

ISR personnel are encouraged to participate in events organized by voluntary bodies and to serve on their councils. Currently, personnel are involved in the councils of the Joint Committee for the Conservation of British Insects, the National Federation for Biological Recording, the British Entomological and Natural History Society (BENHS) and the British Arachnological Society. Assistance has been provided in organizing and running field meetings of the BENHS, Central Panel of Diptera Recording Schemes and Bees, Wasps and Ants Recording Scheme. Such activities allow personnel to establish contacts with outside specialists, provide training opportunities for both ISR personnel and outside specialists and provide experience of a wider range of habitats and species.

An Invertebrate Network has been established to facilitate communication between invertebrate specialists in JNCC and the county agencies and a preliminary meeting was held in March 1992 with personnel from the ISR in attendance.

ISR personnel have contributed to a series of one-day seminars on invertebrate conservation which have been held over the last 3 to 4 years for a variety of bodies including regional staff of the former NCC, county wildlife trusts, the Woodland Trust, RSPB, National Trust, Forestry Commission, British Waterways Board and several utilities in the water and power industries (49 events so far with approximately 2000 attendees). These events provide a means of introducing a wider audience to the principles of invertebrate conservation. In the last year, personnel have also assisted with training events organized by two county trusts, RSPB and an agricultural college.

Objective 6 — to supply progress reports on invertebrate conservation

A project to produce regional overviews of the information contained in the ISR was started in 1988. It was intended to produce reports on the salient features of the invertebrate fauna of each of the former NCC regions, each report being a distillation of data held by the ISR and written for the non-specialist. The member of staff responsible for this project left for a permanent appointment with the Countryside Council for Wales in April 1992. At that stage, overviews for three Welsh regions were complete and draft text was ready for four English regions. The three Welsh reviews will be published by JNCC as a single volume.

An 'ISR Progress' newsletter is in preparation, initially for use primarily in Scotland and Wales, to contact former contributors to the ISR in these countries and to ask for further contributions of up-to-date information. It is intended that this newsletter will eventually go to all contributors and to staff of the country councils.

Perhaps the most important publication on invertebrate conservation in recent years is *Habitat management for invertebrates* (Kirby, 1992b). This work originated as part of the ISR project, but was completed as an external contract with sponsorship from National Power and was published by RSPB.

CONCLUSIONS

The ISR has concentrated on the scarcer species of invertebrates and those sites which have been found to contain the largest assemblage of such species. The objectives as stated by Palmer & Ball (1992) apply to all invertebrates, so to this extent they can only be partly met by the ISR. Other mechanisms, such as the National Recording Schemes run by the Biological Record Centre, which potentially cover all species and all sites, can fulfil at least some of the objectives in the fullness of time. As far as the scarcer species and most significant sites are concerned, the ISR is achieving its objectives as demonstrated above. However, most of the objectives relating to the dissemination of information, through publications which are available to everybody, have only recently been achieved, with a spate of publications in the last three years.

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APPENDIX: STATUS CATEGORY DEFINITIONS

Red Data Book Category 1. RDB 1 — ENDANGERED

Definition

Taxa in danger of extinction and whose survival is unlikely if casual factors continue operating.

Included are those taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are *some* taxa that are *possibly* extinct.

Criteria

Species which are known or *believed to occur* as only a single population within one 10-km square of the National Grid.

Species which only occur in habitats known to be especially vulnerable.

Species which have shown a rapid or continuous decline over the last 20 years and are now *estimated* to exist in five or fewer 10-km squares.

Species which are *possibly* extinct *but have been recorded this century* and if rediscovered would need protection.

Red Data Book Category 2. RDB 2 — VULNERABLE

Definition

Taxa *believed* likely to move into the Endangered category in the near future if the casual factors continue operating.

Included are taxa of which most or all of the populations are decreasing because of *over-exploitation*, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.

Criteria

Species declining throughout their range.

Species in vulnerable habitats.

Red Data Book Category 3. RDB 3 — RARE

Definition

Taxa with small populations that are not at present Endangered or Vulnerable, but are at risk.

These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.

Criteria

Species which are *estimated to exist* in only 15 or fewer post-1970 10-km squares. This criterion may be relaxed where populations are likely to exist in over 15 10-km squares but occupy small areas of especially vulnerable habitat.

Red Data Book Category 4. RDB 4 — OUT OF DANGER

Definition

Taxa formerly meeting the criteria of one of the above categories, but which are now considered relatively secure because effective conservation measures have been taken or the previous threat to their survival has been removed.

Red Data Book Category 5. RDB 5 — ENDEMIC

Definition

Taxa which are not known to occur naturally outside Britain. Taxa within this category may also be in any of the other RDB categories *or not threatened at all.*

There are few truly endemic species in Britain. Most that have been identified are in fairly obscure groups which are relatively poorly known and may eventually be discovered elsewhere in Europe.

Red Data Book Appendix. RDB App. — EXTINCT

Definition

Taxa which were formerly native to Britain but have not been recorded since 1900.

Red Data Book Category I. RDB I — INDETERMINATE

Definition

Taxa *considered* to be Endangered, Vulnerable or Rare, but where there is not enough information to say which of the three categories (RDB 1 to 3) is appropriate.

Red Data Book Category K. RDB K— INSUFFICIENTLY KNOWN

Definition

Taxa that are suspected but not definitely known to belong to any of the above categories, because of lack of information.

Criteria

Taxa recently discovered or recognized in Britain which may prove to be more widespread in the future (although some recent discoveries may be placed in other categories if the group to which they belong is thought not to be under-recorded).

Taxa with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult.

Species with very few or perhaps only a single known locality, inhabiting inaccessible or infrequently sampled but widespread habitats. Examples include some northern moorland species, ones associated with agricultural situations and ones which are adult only during the winter.

Species with very few or perhaps only a single known locality and of questionable native status, but not clearly falling into the category of recent colonist, vagrant or introduction.

Nationally Notable (Scarce) Category A. Na — NOTABLE A

Definition

Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10-km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties.

Nationally Notable (Scarce) Category B. Nb — NOTABLE B

Definition

Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10-km squares of the National Grid or, for less-well recorded groups between eight and 20 vice-counties.

Nationally Notable (Scarce). NOTABLE

Definition

Species which are estimated to occur within the range of 16 to 100 10-km squares. The subdividing of this category into Notable A and Notable B has not been attempted because insufficient information is available.

THE INPUT OF INVERTEBRATE RECORDS FOR SITE IDENTIFICATION, ASSESSMENT AND CONSERVATION AT A LOCAL RECORDS CENTRE

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INTRODUCTION

There are certain basic principles which underscore the activity of biological recording. In addition to the academic or intellectual value that biological records have in helping us to understand more about the status, distribution and ecology of animals and plants, they are also useful for practical purposes such as site protection and conservation. To protect or conserve a site it is important to use whatever knowledge is available — there are no advantages in not having information and there are no advantages in not using it when it is available. Although it is possible to use data to contest a conservation case on a site, it makes a prospective developer go the trouble and cost of attacking that case (and therefore the economics are slightly in favour of the conservationist and may assist in preventing future proposals) and conservationists can use the same data to defend their stance. It is essential for a local records centre (LRC) to establish a reputation for honesty and fairness if its information and advice are to be used constructively. It is, therefore, necessary for its data, its presentation and its advice to be seen to be unbiased and it is not acceptable for a conservationist to be given data which is denied to a developer. It is important to LRCs to be able to provide comprehensive data and sensible, well-informed interpretation of those data.

LRCs need to be populist, as well as elitist, in their outlook. Amenity value and amenity considerations are as important as those of heritage. Politicians, who hold the purse strings and ultimately decide on the policies adopted by local authority LRCs, will understand these amenity considerations more easily than those of heritage and we must be seen to be serving the whole community rather than the naturalists who form only a tiny proportion of the community. The educational value of wildlife is also important. Notwithstanding this populist approach, it is important for an LRC to hold and use records covering as wide a taxonomic range as possible because different taxa are valuable for different purposes. Some may be important in generating public sympathy for a site while others may be more important in assessing the significance of the site.

THE BACKGROUND

The 'green revolution' which, we are assured, has reached the highest levels of government, is the latest manifestation of increasing public interest in and awareness of wildlife. This process has gained strength over at least the last two decades and has percolated into many areas which were previously impervious to persuasion. The term 'econut' was originally coined to describe someone who felt that *ecology* was a reasonable basis for a life-style, but is now more appropriately applied to those who believe that *economics* is the whole basis of our existence. A sympathetic approach to wildlife is now a common feature of activities such as planning and land management, whether they are undertaken by central government, local government, private industry or voluntary bodies.

In 1986 the Metropolitan Districts, such as those in South and West Yorkshire, were instructed by Her Majesty's Government to develop Unitary Development Plans (UDPs) to replace the Structure Plans of the abolished county councils. This instruction came initially without the benefit of any guidance on what the UDP should or should not contain. It was three and a half years after the UDP process started that the Secretary of State for the Environment issued his draft Strategic Guidance, which indicated that UDPs should include policies aimed at safeguarding the environment while providing for development which will contribute to the strategic objectives of economic growth and urban regeneration. In particular, this guidance specified that they should safeguard and enhance areas of ecological and wildlife value and should protect and upgrade the architectural, archaeological and historic heritage. They should include policies that help to conserve the countryside and protect areas of high landscape value for amenity, sport and recreation, nature conservation and tourism. There is, therefore, a statutory obligation on the district councils to provide themselves with adequate information on the natural history of their areas and to take that information into account in making their planning decisions.

There is still an information gap between the naturalists who produce information and those individuals and organizations that need to use it. The naturalists are the main losers in this failure to communicate because sites cannot be protected if their wildlife value is not known and they cannot be properly managed unless adequate information on their habitats and wildlife is available. The vast majority of enquirers concerned with the development of a site are sympathetic to the wildlife interest of a site, even if the final decisions do not favour that wildlife, and very few enquirers intend to use information to oppose wildlife conservation. It is in our interests to help the consumers of information to find appropriate information quickly and efficiently.

Today an LRC is (or should be) an accepted part of the machinery for safeguarding and conserving sites of wildlife interest and it has to be organized accordingly. This means that LRCs focus on providing services to their users rather than accepting contributions from naturalists. This change of emphasis has a marked affect on the ways in which LRCs operate. The first priority is to identify the user groups, the 'clients', and then to discover the types of services which they need. Their primary requirements are for site-based data, but their ability to handle and interpret these data will vary and some of them will need a considerable amount of assistance in understanding the data.

USER NEEDS

Planners, conservationists, land owners and land mangers are the main consumers of site-based information. They are normally concerned with current (or at least recent) information which they can use in deciding on the future use or future management of a site. They need to know the significance of that site within the context of other, similar sites in the neighbourhood, so that they can assess its importance.

Site Protection

Planning departments and land owners, whether individuals or organizations, private or public, are concerned initially with site protection. If a site is to be safeguarded it must be identified as having some value and this value must be assessed. It is important that the cause of conservation is not weakened by including large numbers of low quality sites because there are no criteria for objectively assessing their value.

Planning activities cover two different types of operation — development control (DC), which is the decisions made on planning applications, and forward plans in which longer term aspects such as housing needs and mineral extraction are considered over, for example, a 10-year period. The former is very much a reaction to initiatives taken by other

people whereas the latter allows a framework to be constructed within which DC can operate. LRCs can have an input into both these areas of work, but in different ways. For DC purposes a report is required at short notice (often a couple of weeks) outlining the wildlife value of a site and comparing it with other sites. Few of these sites are likely to be known to be significant in wildlife terms, they are often quite small and they will have definite boundaries. For most of these sites it is likely that none of the LRCs records can be definitely associated with them and the only way of obtaining information is for a specific visit to be undertaken for survey purposes. In forward planning, on the other hand, the wildlife sites of a fairly large area can be considered jointly, their value assessed and priorities determined. This is a far less frenetic exercise and site boundaries are usually less precisely defined than those of sites which are the subject of planning applications. A proportion of the sites are likely to be well known to local naturalists and it is easier to use natural history data in this type of assessment than in DC work.

There is scope within the forward planning process to identify sites of heritage value, both human and natural. These sites can then be incorporated into a list of sites where development is to be discouraged or even banned. Local plans and green belt plans, for instance, will include maps where such sites can be marked and then used to assist the planners in DC when considering planning applications.

For both these types of planning activity, and for liaising with land owners, the need is for information which can be used in reaching decisions. The presence of rare species, rare habitats or rare communities, i.e. the scientific or natural history interest on a site, is one factor to be taken into consideration, but wildlife is becoming increasingly important as an amenity resource and this amenity value is as important as scientific value in planning terms. Information on the populations on the site and the way they use that site are relevant, as are the dates when the records were made.

The LRC's role in site protection involves three stages:

1 identification of a site as having some wildlife significance, and determining the boundaries of each site;

2 assessment of the amenity, educational and heritage value of each site;

3 presenting the results of these activities to the decision makers in a way that allows them to understand the value of the site.

Site management

Sites can be protected in a variety of ways, some of which are more secure than others, depending on the individual circumstances. There is official protection, where a site is assigned a formal status, such as Site of Special Scientific Interest or Local Nature Reserve, and there is unofficial protection where damaging development is excluded as part of an overall plan. Sites are rarely stable and they will change over time, so site protection is not enough. Management is needed to prevent the habitats degrading with time or to direct the changes towards defined objectives.

Land owners and managers need information about each of the units they have to manage. These units include stretches of hedgerow, ditches or walls and discrete areas of grassland or scrub, and therefore a site will be divided up into a number of compartments for management purposes. A site is not a uniform entity to be managed as a single unit using a single process, and records from that site are of little use to a manager if they are not localized. This degree of detail has rarely been achieved by amateur naturalists in the past because there has been no reason to collect it and little chance to use it. LRCs can be in the forefront in undertaking or encouraging surveys directed to these types of need. Land managers need to monitor their management actions to see how the results compare with their aims so that their work can be kept under review. Therefore, they need quantitative as well as qualitative data relating to individual compartments. These data can only be collected if site visits are undertaken for the specific purpose of obtaining them. The difficulties of obtaining standardized information which will be useful for managing the vertebrates and flowering plants on a site are difficult enough, but trying to

do it for invertebrates is even more daunting.

The needs of practical users can be summarized as follows:

1 data associated with discrete sites and preferably with discrete compartments and habitats within those sites;

2 a good knowledge of other similar sites so that a context can be created against which each individual site can be assessed;

3 quantitative data which can be used to support site protection and enhance site management.

INVERTEBRATE DATA

At an early stage in the existence of an LRC, the staff have to make a number of fundamental decisions about its methods of operation. Its geographic coverage, for instance, is a factor which will allow the staff to concentrate on the area where they can make the greatest impact. Most LRCs cover one or more counties. In South Yorkshire the LRCs are operated by the district councils and therefore cover much smaller areas, usually in more detail than those covering larger areas.

Another decision concerns the taxonomic coverage of the LRC, which is related to the function of the LRC as an information resource for its users. Planning decisions and, to a lesser extent, management decisions within a local authority are made by politicians and, despite recent conversions on the road to Damascus (or at least to the next general election), most politicians have little interest in wildlife and know even less about it. They are often prepared to accept statements on site quality if these are made by an appropriate organization such as English Nature and, increasingly, by LRCs. They also reflect the heightened public interest in the environment and therefore view wildlife as a public amenity. It is in our interests to encourage this attitude. Few sites in an LRC's area are likely to be nationally significant and therefore justify protection on scientific grounds alone and if our aim is to conserve a wide range of wildlife sites, rather than a small number of nature reserve 'islands', public amenity is a useful justification. Most reports from an LRC will go to other officers rather than directly to the elected councillors and will be incorporated into the general advisory process. We have, therefore, to convince the professional planners and land managers as much as the politicians.

This brings us, at last, fairly close to the title of this paper. Which taxonomic groups are most useful for advising planners and land managers and where do invertebrates fit into the overall picture? The answers will vary depending on circumstances, but some general points can be made. Species which have English names are far more acceptable than those which do not. Both officers and councillors feel that they ought to know an animal or plant if it has a vernacular name and thus they feel that they can relate to it. The opposite is true of a species which has only a scientific name. No matter how obscure the black-necked grebe, the fingered sedge or the dingy skipper may be, they are 'acceptable' to these decision makers. Some LRCs do restrict themselves to dealing towards vertebrates and flowering plants, and the only concessions they make with invertebrates are likely to be butterflies and, perhaps, dragonflies. The animals and plants in these groups all have vernacular names and are, as a result, easier to incorporate into reports to non-biologists. There is an advantage in this approach that we should be aware of, because once a species is 'accepted' then its conservation becomes 'a good thing'. There is no need to resort to quoting Red Data Book or Notable status for each organism when a site can be protected on the basis of its bluebells, blue tits and blue-tailed damselflies. This attitude is one which we should also encourage. I support moves to allocate vernacular names to some of the larger and more noticeable insects as it then becomes easier to interest non-entomologists in them and to use them for site protection. The adjective *common* in an English name can be omitted with advantage wherever possible; common spotted orchid, common blue damselfly and common frog will not suffer from such etymological surgery, reports will benefit from it and we will not weaken our own case by arguing for the conservation of a species which would otherwise be named as *common*. However, such

use of vernacular names must not be allowed to mask poor taxonomy or ambiguous nomenclature.

The identification of a site of wildlife interest will result from an input from a variety of individuals and organizations. Local natural history societies will have a list of their favourite sites and these will be augmented by specialist contributions, including those from the LRC staff themselves.

Site assessment is often subjective because our knowledge of the sites in our areas is always imperfect. The criteria for assessing amenity value, educational value or heritage value are not necessarily the same, and this is where a good taxonomic coverage is useful. Many of the 'best' wildlife sites and a large number of others which are more important for their amenity or educational interest than for their heritage value can be defended by using the records of flowers, birds and butterflies. The plants have a special value in that they create the habitats within which the animals live. Botanists have got their act together to a very great extent and can now argue that a site is 'special' because of the community of plants which it holds. None of the species need to be rare, but their association may be rare. Our knowledge of invertebrates does not often allow us to evaluate insect communities. Ornithologists have managed to raise the public appreciation of birds to the position where bird preservation is universally accepted and a site can be 'special' because it holds good populations of common species or large numbers of wintering waterfowl. Some mammals, such as bats and badgers, are also valuable in putting forward arguments for site protection. Much of this public awareness is now enshrined in national and international legislation.

My own view is that these popular groups have a vital role to play as the 'shop windows' of conservation, and the sites which are protected because of them will also protect the host of invertebrates and non-flowering plants which inhabit the same sites. Information on the other invertebrates on these sites usually provides a supporting argument by indicating that the site has a heritage as well as an amenity value or to emphasize the breadth of its scientific interest, and it helps in the process of educating the decision makers of the need for a wider view of wildlife protection.

Not all sites which are valuable to an entomologist, however, will be covered in this way because not all will be important for birds and flowering plants. Some of these sites may be very small, even individual trees, or have virtually no other wildlife value. If invertebrates, other than dragonflies and butterflies and possibly macro-moths, are to be used, other criteria need to be developed. As noted above, a context is essential. Invertebrates cannot be successfully used for site protection unless the LRC has a volume of records sufficient to allow comparisons to be made with other sites in the area. We do not have the luxury of a sympathetic audience and need to use rather unsatisfactory arguments, such as rarity, to persuade them that protecting a site for its insects is logical. The existence of published reports from the Invertebrate Site Register, now included in the RECORDER package, from which we can quote RDB and Notable statuses, is extremely useful. The ISR initiative of the Invertebrate Index is also helpful as it gives a more objective definition of the value of a site. While the flowering plants are the best guide to the type of habitat, the invertebrates are often the best guide to its quality, and the careful use of indicator species can also be valuable.

CONCLUSIONS

Insect records can be brought into the process of site protection, either on their own or in support of information on birds and plants. The protection of the same site can be argued on amenity and heritage grounds at different times, depending on the opportunities which the planning processes offer. The guiding principle must always be honesty, with no attempt to overstate significance. The LRC staff must be prepared to defend their statements, at public inquiry if necessary, and should be able to withstand that scrutiny. There is no advantage in trying to make a site appear more important than it really is; such action is likely to have adverse consequences if a less valuable site is protected at the

expense of a more valuable but currently non-threatened one.

Site management, i.e. conservation, works in a similar way. Because of the relative ease with which flowering plants and birds can be surveyed, counted and monitored they are the taxa which are normally used to determine management aims and practices. Management for flowering plants can, however, be very different from management for invertebrate populations, and we need to provide statements on the requirements of particular insect groups or guilds. Part of the value-added factor of the work of an LRC is to identify the habitat requirements of the significant species and then to encourage appropriate management activities. The presence of a dead-wood community, for instance, can be used to insert appropriate conservation measures into the management aims of a particular wood and also as a general input to plans for other woodland sites.

A local records centre can make use of entomological data in site identification, assessment, protection and conservation, but the importance of those data will vary. They are just as important as other types of data for site identification and are often amongst the most valuable for site assessment. They have to be used judiciously in arguing for site protection, particularly if development of the site is favoured by planners or politicians. It is easier to use the comparatively relaxed forward planning process to confer protection on a site, rather than having to argue the case against a proposed development, and invertebrates are often better used to support the case for organisms with high 'public interest' rather than being thrust directly into the spotlight. Management advice will also be most acceptable if presented as an integrated scheme. For all these tasks, it is essential for the LRC to have confidence in its advice and this requires sufficient depth of information for that advice to be securely based. A large database of invertebrate records is needed to provide this confidence.

THE USE OF SAPROXYLIC INVERTEBRATES IN THE SELECTION AND EVALUATION OF AREAS OF RELIC FOREST IN PASTURE-WOODLANDS

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INTRODUCTION

Types of woodlands and forest relics

Traditional woodland management throughout most of Britain has been mainly by coppicing or by a combination of coppicing with maiden or 'standard' trees. Until the 1970s woodland conservation policy in lowland Britain was concentrated towards coppice/coppice-with-standards woodland, these being the most prevalent and best documented types of woodland. Such woods were recognized as being important for their distinctive vascular floras and, in some cases, for their butterflies. Almost all the woodland areas protected by statutory legislation or by the voluntary conservation movement, up to the 1970s, were of this type.

These types of woodland management resulted in little habitat for the fauna and flora particularly associated with the older age-classes of trees which would have occurred in natural (unmanaged) forest in these latitudes (see, for example, Warren & Key, 1991). Evidence of sub-fossil remains from Holocene sites suggest that natural forest with mixed species and age classes of trees survived in some areas until at least 3000 years before the present. A noticeable feature at some of these sites is that there were large, old trees. In the few cases where sub-fossil insect remains have been studied, a varied saproxylic fauna has been recorded in association with evidence of abundant, and often large, trees.

Several of the saproxylic species recorded in Holocene deposits no longer occur in Britain (Girling, 1982). Others have been recorded in the 19th and 20th centuries at a small number of sites characterized by Ratcliffe (1977) in the *Nature conservation review* as 'mixed deciduous woodland: ancient parks and overmature woodland'. The importance of these sites as refugia for a hitherto neglected component of the British flora and fauna was coming to be recognized in the 1970s. At this time, two leading British woodland ecologists, Oliver Rackham and George Peterken, were (largely independently) developing their knowledge and ideas on the role of woodland management history in influencing present-day woodland communities. The 'wood pasture' form of woodland management was recognized by both Rackham and Peterken as an important and distinctive woodland type. Also, Francis Rose had been developing an index of ecological continuity in woodlands, using epiphytic lichens, mainly in areas with large and old trees such as parks and other areas managed as pasture-woodlands.

A survey of the 'mature timber habitat'

In 1975, P.T.H. was commissioned by the then Nature Conservancy Council (NCC) to examine the extent of the 'mature timber habitat' in lowland Britain. The project, which extended over four years, was primarily to identify areas which were known to be of importance, or which may have potential, for saproxylic invertebrates. A later part of the project looked at the problems of management of such sites.

An initial inventory of sites was compiled by P.T.H. in 1975, based largely on published and anecdotal information on the occurrence of saproxylic species and on information about sites with numbers of large, old trees. In 1976 and 1977, he visited about 100 such sites to assess the extent and quality of the habitat potentially available for saproxylic fauna. The project did not include opportunities for systematic sampling at these sites in the way that the complementary surveys of lichens were being made by Francis Rose.

A list of saproxylic invertebrates

As part of the project, the help of several of the most experienced entomologists in Britain was enlisted to compile a list of (mainly) saproxylic species which were regarded as being characteristic of sites already accepted as being rich in saproxylics. This self-fulfilling prophecy was developed with reference to the work of Palm (1959) and related work on other groups, for example Rose's 'index of ecological continuity' (using lichens) (Rose, 1974, 1976), Peterken's 'ancient woodland indicators' (using vascular plants) (Peterken, 1974) and ancient woodland molluscs (Paul, 1979). The list of beetles, published in a report (Harding, 1978), was tested over several years and a revised version, for saproxylic Coleoptera only, was eventually published in Harding & Rose (1986). However, the original list of Coleoptera was compiled from the combined knowledge and experience of A.A. Allen, P.M. Hammond, F.A. Hunter, C. Johnson and P. Skidmore, to whom full acknowledgement must be given.

Previously, comparative lists of a few species and a small number of sites had been compiled by Allen (1966) and Welch & Harding (1974). After the publication of the original list in Harding (1978), several authors have compared or evaluated sites using the list (Hammond, 1979; Welch & Cooter, 1981; Atty, 1983; Garland, 1983).

The 196 species included in Annex 2 of Harding & Rose (1986) was regarded as tentative. They emphasized that the list could only be used to evaluate sites with the following limitations in mind:

1 it is a list of saproxylic species believed to be associated with dead-wood habitats in ancient pasture-woodlands; it is not a list of woodland indicators;

2 it is a national list for lowland Britain in which regional variations can be accommodated to only a limited extent;

3 the ecology and distribution of many species is relatively poorly understood.

INDEX OF ECOLOGICAL CONTINUITY FOR SAPROXYLIC COLEOPTERA

In a paper to a regional meeting of the Royal Entomological Society at Leicester in 1987, K.N.A.A. proposed the development of an 'index of ecological continuity for saproxylic coleoptera' based on the list published in Harding & Rose (1986) (Alexander, 1988).

This index complemented that developed for lichens, but with the added advantages that a larger suite of species was used (195 beetles as against 30 lichens), the list was graded enabling more refined usage and the species are not so sensitive to atmospheric pollution. Disadvantages were that, unlike lichens, beetles are seasonal and many species are difficult to sample. In a recent paper, Hammond & Harding (1991) described the range

of sampling techniques used in conducting qualitative and quantitative surveys of saproxylic invertebrates. More detailed information on techniques (in a tropical context) is given by Hammond (1990).

The 195 saproxylic species (one non-saproxylic was omitted) listed by Harding and Rose were categorized in three groups according to the extent to which they have been consistently recorded from areas of ancient woodland with continuity of dead wood habitats. For example Group 1 species were regarded to be the most faithful to such sites and Group 3 those which could occur widely in wooded land.

K.N.A.A. proposed that these three groups should form the basis of a scoring system, on a presence/absence basis, to interpret lists of species recorded at a site and to provide an evaluation of the site based on the species of saproxylic Coleoptera recorded. The value of each of the three groups, as related to the others, is subjective, but Group 1 species were regarded to be more important (for reasons of scarcity and apparent faithfulness to known ancient pasture-woodlands) than those in Group 3 and therefore merit a higher score. Thus the presence of a Group 1 species scores 3, a Group 2 species scores 2 and a Group 3 species scores 1.

A decision was made to exclude historical records in the calculation of the index and only records since 1950 have been used. The index is intended to be used in evaluation for nature conservation and therefore should reflect the current and recent past interest of the sites being considered. Many of the anecdotal records available for sites are historical. Including such records would bias the index to select sites which were important in the early 20th century, but many of which subsequently have been destroyed or severely degraded as relics of forest with old trees. The cut-off date for records to be used in the index was settled at 1950, following the example of the NCC's Invertebrate Site Register.

The general paucity of records for many sites, and the absence of any systematic attempt to survey the beetles of a large number of sites, inevitably means that comparisons of one site with others are subject to considerable bias. The original index values calculated in 1987 have been subject to ongoing revision as new records for sites have been incorporated and as completely new sites have been surveyed. However, it is possible to place a site on a scale of importance relative to other sites providing the above caveats are accepted. Table 1 is a list of the most important pasture-woodland sites in lowland Britain assessed using the 'index of ecological continuity' (IEC).

Index values of 20 or more appear to identify the most important sites of a national series, but this threshold may need to be raised as more survey results become available.

The sites listed in Table 1 should be considered as priority areas for conservation measures to protect and perpetuate the habitat.

GEOGRAPHICAL DISTRIBUTION OF SITES IN BRITAIN

The list of sites in Table 1 has a clear bias towards the lowlands and the south-east. Ecological considerations suggest that this bias reflects the probable range of the largely thermophilous species included in the assemblage, but recorder bias is almost certainly present; few sites in Wales, the south-west and northern England have been surveyed in detail. Based on pre-1950 records, sites such as Gibside (Tyne and Wear) and Shute Park (Devon) have IEC values of 26 and 31 respectively. However, important sites such as Moccas Park (Hereford/Worcester) and Duncombe Park (North Yorkshire) are on the fringes of this lowland/south-eastern area.

Regional indices, based on the national index, would provide greater sensitivity in the assessment of sites. Garland (1983) proposed such a regional index, based partly on Harding (1978), but did not distinguish clearly between the specialized saproxylic species and general ancient woodland indicators. Further consideration should be given to either regional indices or to regional weighting of the national index, but the collection of more data (new sites, systematic surveys by specialists, resurvey of sites omitted from the present list due to the age of the records, collation of unpublished data) are probably a more urgent priority.

Table 1. The most important national sites for the saproxylic Coleoptera of ancient woodlands, especially pasture-woodlands, graded using the index of ecological continuity (IEC)

Site Name	Area* (Ha)	Number of recorded species in each grade**			Calculated IEC
		1	2	3	
Windsor Great Park & Forest	710	48	22	45	233
New Forest	3800	25	22	64	183
Moccas Park	140	23	12	36	129
Epping Forest	1150	10	11	47	99
Sherwood Forest	525	14	9	34	94
Richmond Park	940	10	9	26	74
Burnham Beeches	453	3	13	31	66
Clumber Park	1500	6	8	31	65
Calke Park	80	6	6	34	64
Arundel Park	109	7	6	30	63
Knole Park	383	6	9	26	62
Wytham Woods	230	2	10	34	60
Monks Wood	157	5	5	28	53
Staverton Park	85	5	5	24	49
Bredon Hill	-	8	5	13	47
Dunham Massey Park	78	2	6	26	44
Kedleston Park	819	3	3	27	42
Blenheim Park	900	7	3	13	40
West Walk, Bere	-	2	4	25	39
Duncombe Park	78	3	2	24	37
Attingham park	c.150	3	4	18	35
Buxted Park	c.90	4	3	17	35
Box Hill	-	1	4	24	35
Grimsthorpe Park	92	1	3	26	35
Icklingham Plains	c.180	5	2	15	34
Hatfield Forest	360	4	4	14	34
Ashtead Common	c.200	6	4	7	33
Donington Park	c.120	4	3	15	33
Savernake Forest	930	5	3	12	33
Forest of Dean	c.8000	2	2	23	33
Thorndon Park	c.200	1	3	23	32
Stockton's Wood	c.15	1	3	19	28
Brampton Bryan Park	175	1		25	28
Lullingstone Park	260	1	5	15	28
Cirencester Park Woods	c.800		3	22	28
Rockingham Castle Park	60	1	3	18	27
Shrubland Park	80	3	4	10	27
Croft Castle	c.400	1	2	19	26
Chatsworth Park	630	3	2	12	25
Lower River Weaver Woods	c.100	2	1	16	24
Nettlecombe Park	c.80		3	17	23
Dinefwr Deer Park	97			23	23
Thorne Moors	-		2	19	23
Harewood Forest	650	4	1	8	22
Castor Hanglands	c.100	1	1	16	21
	70		2	16	20

* Approximate areas, where known. ** Graded in Harding & Rose (1986)

A EUROPEAN PERSPECTIVE

In 1980, the Council of Europe set up a Consultants' Group to identify projects related to invertebrate conservation which might be supported by the Council. A project on saproxylic invertebrates was selected to provide insight into the decomposer sector in ecosystems. An advantage of this project was that additional information on the remnants of the natural forests of Europe would be acquired.

The project began in 1982 with the establishment of criteria for use in the selection of the saproxylics to be used as bio-indicators of site quality. The criteria, listed by Speight (1989), resulted in a list of 33 insect species. This list was soon abandoned because the species were already so localized within their European range that only a few forests would be identified as a result, although those sites would probably have been the *crème de la crème*. None of the species listed is known to have occurred in Britain in recent times. Based on the original criteria, a revised and considerably expanded list of about 200 species of Coleoptera, Diptera, Hemiptera and Hymenoptera was prepared (Speight 1989, Annex 1). Using this list of species and a simple questionnaire, Speight sought information on the sites regarded by national specialists to be the most important for these and similar species. Four relic deciduous forest sites were selected from the information collated by Speight: Windsor, New Forest, Epping Forest and Moccas Park. The Caledonian pine forest at Abernethy was also included.

CONCLUSIONS

The evaluation of sites for wildlife conservation has traditionally been based on botanical and ornithological assessments. In the case of relic woodlands formerly or currently managed by the wood-pasture system, vascular plants (primary producers) and birds (secondary producers) are unlikely to provide meaningful measures of the importance of such sites. Decomposers, such as saproxylic Coleoptera, are especially associated with such relic areas and provide a more reliable measure of the biodiversity of sites. A simple method to assess deciduous pasture-woodlands in lowland Britain has been developed which uses available data, often derived from the biological recording activities of a small group of specialists. More data are needed to develop and improve the present index of ecological continuity of saproxylic Coleoptera, but the preliminary results show that it is possible to identify and rank sites at a national level. Hammond & Harding (1991) discussed ways in which the present list of species could be improved (for example by the addition of some species and the omission of others). They also proposed that lists of rare non-saproxylic woodland Coleoptera could be compiled for use in the evaluation of sites.

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INVERTEBRATES IN MONITORING ENVIRONMENTAL QUALITY AND CHANGE

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INTRODUCTION

Environmental monitoring, of wildlife rather than chemical factors, has tended to concentrate on plants and birds as indicators of quality (e.g. Ratcliffe, 1977; authors in Goldsmith, 1991), with relatively little regard being taken of invertebrates, which make up by far the largest numbers of species in any given environment. As there are considerable numbers of invertebrates at any given site, it is very likely that some invertebrate groups will be useful in environmental monitoring. There has been recent work on a number of groups of invertebrates, both terrestrial and freshwater, with a view to their use in assessing environmental quality and investigating change with time. Invertebrates can be used to assess sites for conservation (Luff, 1987; Foster, 1991), for pollution monitoring (e.g. Moss *et al.*, 1987), for investigating land management effects (e.g. Rushton *et al.*, 1989) and there is some work indicating the possibility of their use in investigating changes brought about by, for instance, climate change (Watt, Ward & Eversham, 1990).

SITE QUALITY ASSESSMENT

Several of the conservation criteria outlined by Ratcliffe (1977) are difficult or impossible to quantify, but for routine site assessment criteria must be quantifiable, so that sites can be ranked; some criteria can be quantified using invertebrate data.

Diversity

There are many diversity indices which take into account both the number of individuals and the number of species. The simplest measure of diversity is species richness, but this, and diversity indices, still present problems when used for invertebrates. The number of invertebrate species recorded from a particular site tends to be dependent on the amount of sampling effort, and comparisons of site lists can be misleading if the sampling techniques and effort have not been the same. Thus, standardized techniques are required using the same time period. One such method is pitfall trapping, as outlined by Luff, Eyre & Rushton (1992). Other trapping techniques, such as interception traps, may also be applicable, but care needs to be taken as to the group of invertebrates for which they are used. It is essential to have sufficient knowledge of the taxonomy, ecology and biology of the group before they can be used in site assessment.

Rarity

Rarity is the most easily understood and most 'political' assessment criteria, and the one where biological recording can be used to best advantage. Ball (1986) produced a list of the rare invertebrates in Great Britain, which could be used in an invertebrate index, but

good distribution data are essential for such an index and this factor will restrict the number of invertebrate groups which can be used. Work on the quantification of rarity, and on the production of rarity indices, has been carried out for water beetles and ground beetles. Foster (1987) proposed the use of a species rarity index based on the UK national water beetle recording scheme and this was used by Foster *et al.* (1989) to assess the quality of drain sites in eastern England and by Foster & Eyre (1992) to rank sites in a number of areas of the UK. On a regional basis, Eyre & Rushton (1989) produced rarity indices for both water and ground beetles in north-east England. A calculation of rarity association was also attempted with regional tetrad (2 x 2 km) data (Eyre, Ball & Foster, 1985; Eyre, Luff & Ball, 1986), to emphasize those sites with rare assemblages. Using these indices, sites can be ranked in water and ground beetle habitat types generated from classifications (Eyre, Ball & Foster, 1986; Luff, Eyre & Rushton, 1989). A classification of British grassland ground beetle habitats (Eyre & Luff, 1990a) should enable a national rarity index, based on the forthcoming carabid atlas, to be used to rank sites on a national basis.

Typicalness

One of the objectives outlined by Ratcliffe (1977) was to conserve good examples of habitat type. This is a difficult criterion to quantify without the complex ordination technique used by Eyre and Rushton (1989), which may preclude general application. Usher (1980) asserted that there was a relationship between rarity and typicalness, in that the presence of rare species at a site meant that a site could not be typical, but this was found not to be the case (Eyre & Rushton 1989) because rare species can be archetypical in a rare habitat.

Naturalness

For an assessment of site naturalness to be made, knowledge is needed of a previous, more 'natural', situation. In north-east England considerable entomological recording was carried out by James Hardy and Thomas Bold between 1843 and 1875. They published information for several sites, so that lists of beetle species can be compiled from a time before the sites were developed for agriculture, mining or building. The recent classifications of both water and ground beetles in north-east England can be used to place historical records into a perspective of habitat and temporal change. Foster (1992) showed the changes through time at two sites in north-east England (Figure 1). Boldon Flats changed from a lake in the 1850s to a pond in the 1930s to temporary water in the 1980s whereas Prestwick Carr went from a transition mire in the 1850s to a pond in the 1970s to a marsh in the 1980s. There has been attempts, at Boldon Flats, to construct a more 'natural' situation by digging a permanent pond and the results can be monitored using water beetles.

ASSESSING ENVIRONMENTAL CHANGE

Land management

Land management has been shown to affect the distribution of species in several invertebrate groups and there is potential for using these animals to monitor land use change. Most work has been carried out using pitfall traps and on the effects of management on ground beetles and spiders. Rushton, Luff & Eyre (1989) investigated the effects of upland pasture improvement by physical means and by pesticide application and found that both ground beetle and spider assemblages reflected change. Agricultural management dictates the distribution of ground beetles (Rushton, Eyre & Luff, 1990a; Eyre, Luff & Rushton, 1990), spiders (Rushton & Eyre, 1989, 1992) and, to a lesser extent, weevils (Luff & Eyre, 1988; Eyre *et al.* 1989). The management of nature reserves is also

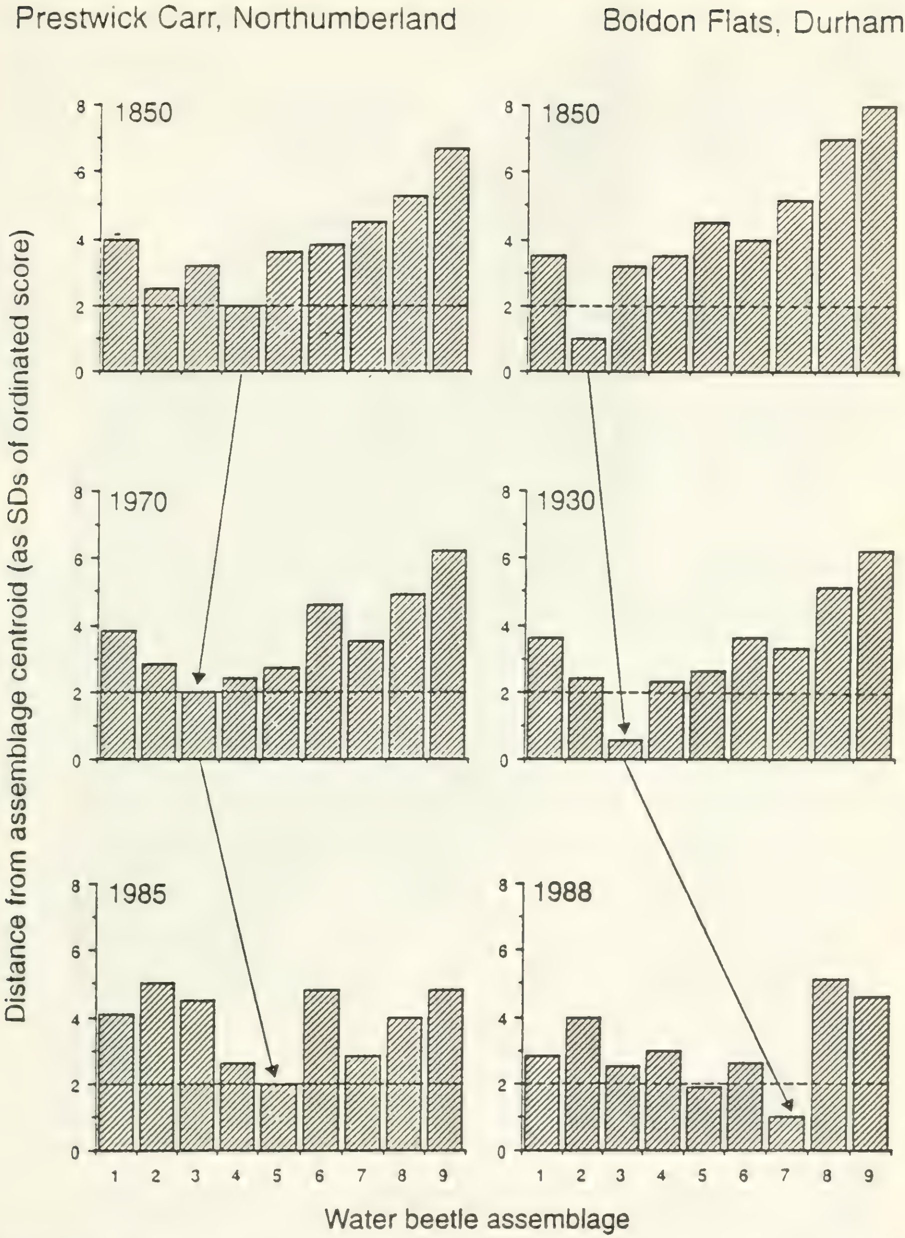

Figure 1. Changes with time in the water beetle assemblages at two sites in north-east England to the nine habitat groups recognized; 2=lakes, 3=lowland ponds, 4=transition mires, 5=marshes, 7=temporary water (from Foster, 1992).

reflected by spider and ground beetle assemblages (Rushton, 1988; Rushton, Eyre & Luff, 1990b).

In the Countryside 1990 Survey, carried out by the Institute of Terrestrial Ecology (ITE), the incidence of water beetle species in 1-km national grid squares has been shown to reflect land cover at the 1-km square level and Foster (1992) described how land use practices affect water beetle distribution. This work opens up the possibility of using water beetles to monitor land use changes at the landscape scale.

Pollution monitoring

The possibility of using river and stream invertebrates for monitoring the effects of water pollution and for assessing the environmental effects of acid precipitation has been investigated. The work of Wright *et al.* (1984) was developed by Moss *et al.* (1987) and Wright *et al.* (1989) to produce a system to predict invertebrate assemblages given a set of environmental factors. This system is now in use in each of the National River Authority regions to identify lengths of river which are polluted, so that remedial action can be taken. Water acidification in Wales has been investigated using stream invertebrates (Ormerod & Edwards 1987; Ormerod & Wade, 1990) so that predictions of change can be made (Wade, Ormerod & Gee 1989).

Climate change

The potential for using invertebrates for assessment of changes due to climate fluctuation must be great given the ability of some groups to adapt rapidly by colonization. Watt, Ward & Eversham (1990) outlined some possible changes and noted a relationship between the distribution of numbers of dragonfly species and a spring isotherm. The distribution of water beetles has been related to climate in northern England and southern Scotland. The distribution of *Colymbetes fuscus*, based on a climate index derived from temperature, rainfall, windspeed and sunshine hours, is shown in Figure 2. Potential changes in distribution brought about by an increase in temperature, sunshine hours and windspeed and a decrease in rainfall can be predicted and the potential changes in *C.fuscus* distribution are shown in Figure 3. However, the effects of climate change are more likely to be at the ecosystem level (Cannell & Hooper, 1990) with considerable changes in land use (Parry & Carter, 1989). These changes will effect niche availability and environmental factors such as water availability, water acidity, soil structure and land cover. An understanding of the environmental factors which limit species distribution is required and this will limit the use of invertebrates to those group for which knowledge is adequate.

One change likely to occur if there is an overall rise in temperature, and therefore evapotranspiration, is a change from permanent to temporary water. Eyre *et al.* (1992) have shown that water beetle species differ in their response to temporary water conditions and differ between larval and adult stages. Species preferring temporary water are likely to be favoured by a temperature increase and permanent water species detrimentally affected. Changes in soil chemistry are probable with climate change, with increased turnover of organic matter and rock weathering (Ineson & Stevens, 1990). This may lead to a reduction in acidic water conditions. Water pH is a major factor affecting invertebrate distribution in both static (Eyre, Foster & Foster, 1990) and running water (Sutcliffe & Hildrew, 1989) and a change away from acid conditions will favour groups of invertebrates such as mayflies.

Soil turnover rates and evaporation will also affect the distribution of ground beetle species. Rushton, Luff & Eyre (1991) and Luff, Eyre & Rushton (1992) have shown that soil water is a major determinant of carabid beetle distribution. Eyre & Luff (1990b) have shown that the continental distribution of some species of ground beetle is different from the British distribution. Species found on coastal sand in Britain, such as *Broscus cephalotes*, are found in the middle of the European land mass on very dry, brittle soils and it may be that these conditions will be produced in inland Britain and distributions of some

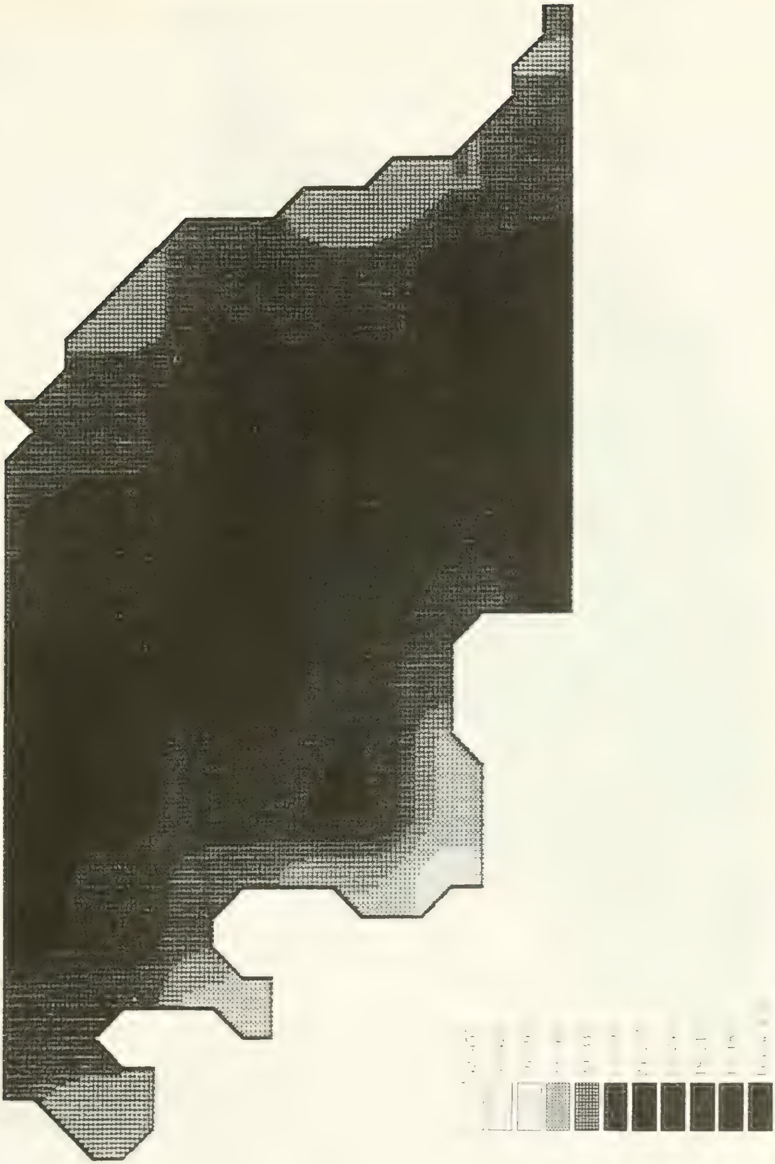

Figure 2. Interpolation of the distribution of *Colymbetes fuscus* derived from the climate index.

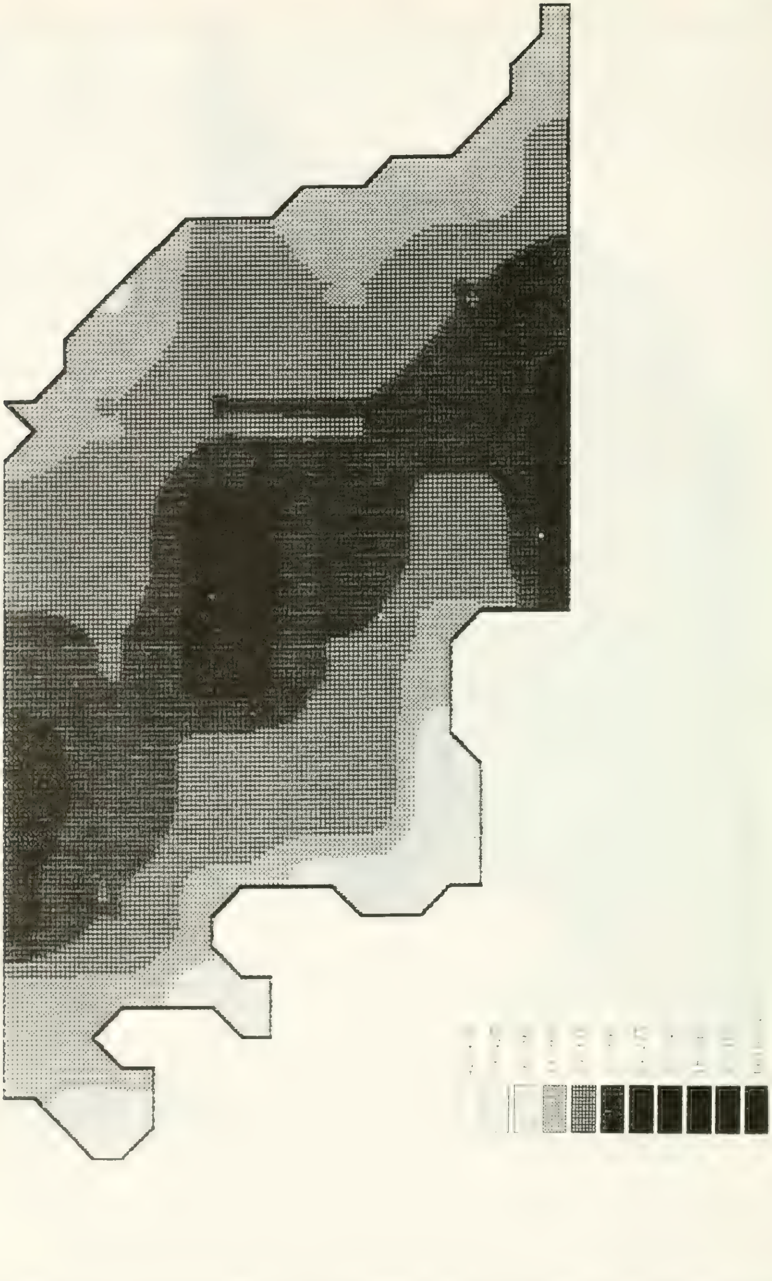

Figure 3. Interpolation of the potential distribution of *Colymbetes fuscus* given a change in climate (see text).

beetle species changed. If climate changes affect land use, land cover will change and this will also be reflected in ground beetle distributions.

CONCLUSIONS

1 The potential for using invertebrates in environmental monitoring is considerable.
2 Invertebrates can be used for both assessing site quality and for investigating environmental change.
3 Species in some groups are good indicators of site relic status and the information gathered by both national and local recording schemes is of paramount importance in assessing site quality.
4 There is a requirement for adequate knowledge of an invertebrate group's taxonomy, biology and ecology before they can be considered in monitoring environmental change.
5 The use of invertebrate groups for environmental monitoring will be limited to those which can be sampled with relative ease and identified accurately.
6 Environmental change brings about habitat modification and the most important requirement is for a knowledge of the distributional strategies of individual species or species assemblages. Changes in invertebrate distributions can then be related to changing environmental conditions.

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USING INVERTEBRATES TO MONITOR LAND USE CHANGE AND SITE MANAGEMENT

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BACKGROUND

Invertebrate recording can be done at various levels, from national schemes (most of which were originally aimed at species mapping), to regular weekly counts of species on a measured transect at a single site. Even the simplest survey can have some potential role in monitoring. Provided the nature of data collection, and its inherent biases, are fully understood, large-scale changes should be detectable. The more refined the data collection methods used, the finer the scale of changes which may be studied. Table 1 summarizes the range of survey methods currently in use. This paper aims to review the different levels of recording, and to illustrate the sorts of change which each may detect. Examples are chosen from the past, the present and — speculatively — the future; and from four major forms of environmental change:

1 Land use change (habitat loss and creation);
2 Pollution and amelioration of pollution;
3 Climate and weather;
4 Site management.

HISTORICAL DATA FOR MONITORING PAST CHANGES

National

For many groups of invertebrates, the historical records held by the Biological Records Centre are detailed enough to illustrate the extent of habitat loss or degradation and some regional variations. Uncommon or threatened species, such as those included in national Red Data Books, may show this most clearly; but even common species may have declined or become extinct in those parts of the country in which their habitats have been most affected by development and modern agriculture. The three following examples show a range of patterns of change which are discernible in national distribution data.

The shining ram's-horn snail *Segmentina nitida* (Gastropoda: Planorbidae) lives in unpolluted ponds and ditches, usually with a rich macrophyte flora. It was widespread in lowland England in the last century (Figure 1). It has declined due to pollution and eutrophication, and is now confined to a few small areas, mainly ditches in grazing marshes, and the Norfolk Broads (Kerney, 1976).

The large marsh grasshopper *Stethophyma grossum* (Orthoptera: Acrididae) occurs mainly in quaking peatbogs and in the wettest parts of fens (Figure 2). Drainage in the 19th century destroyed all its sites in eastern England. Since 1950, commercial peat extraction has greatly reduced its populations in the Somerset Levels (Marshall & Haes, 1988).

The black darter dragonfly *Sympetrum danae* (Odonata: Libellulidae) is widespread and abundant over much of Britain (Figure 3). It has a strong preference for acid water,

Table 1. Levels of invertebrate data gathering.

Type	Characteristics	Examples
Historical	Unplanned Mainly 'popular' groups Very patchy	Most museum and literature sources
Individual	1 or few species Fixed, usually short, time Repeatable Potentially wide coverage	Glow-worm survey Firethorn miner Chequered skipper
National Recording Schemes : routine	Most groups Can be patchy Varies over time	Orthoptera Fleas
National Schemes: targeted species	Species showing change Limited time Potentially repeatable	*Conocephalus* in Orthoptera scheme
National Schemes : targeted sites	Limited no. of sites Thorough coverage in limited time Option of resurvey	Odonata Key Sites Project BSBI Monitoring Scheme
Regular monitoring with agreed protocol	Limited no. of sites High commitment from recorders Continuously detects changes	Butterfly Monitoring Scheme

and is usually found on heaths and peatlands (Hammond, 1985; Askew, 1988). This habitat has declined most severely in eastern England and the Midlands, both through the drainage and reclamation of wetlands for agriculture, and through eutrophication by agricultural fertilizers. As a result, *S. danae* is now rare or absent over a wide area (Moore, 1986; Merritt, *et al.* in press).

HISTORICAL DATA FOR MONITORING PAST CHANGE

Local

For certain well-recorded sites, historical data, in the literature and in museum collections, may be detailed enough to identify changes in the invertebrate fauna over time, which can be related to land use changes.

Thorne and Hatfield Moors in South Yorkshire are the two largest lowland raised mires in Britain, each exceeding 1200 ha. Over 3000 species of invertebrates have been recorded on the moors, including six species which are known nowhere else in Britain (Skidmore *et al.*, 1987; Eversham *et al.*, in press). At least three of these, the muscid fly *Phaonia jaroschewskii* (Skidmore, 1991), the ephydrid fly *Pelina guttipennis* and the byrrhid beetle *Curimopsis nigrita*, are believed to be rare throughout Europe.

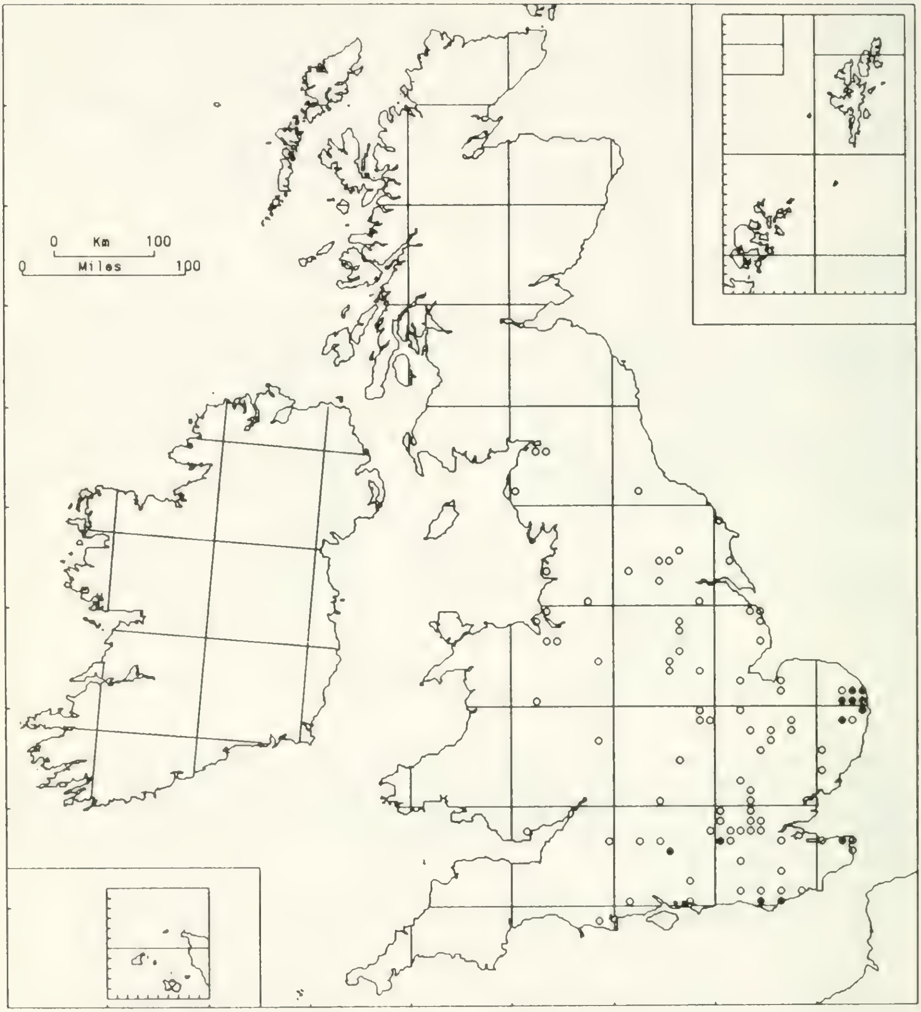

Figure 1. National distribution of the shining ram's-horn snail *Segmentina nitida* (Gastropoda: Planorbidae). Open circles refer to records before 1950; filled circles represent post-1950 records (from Kerney, 1976).

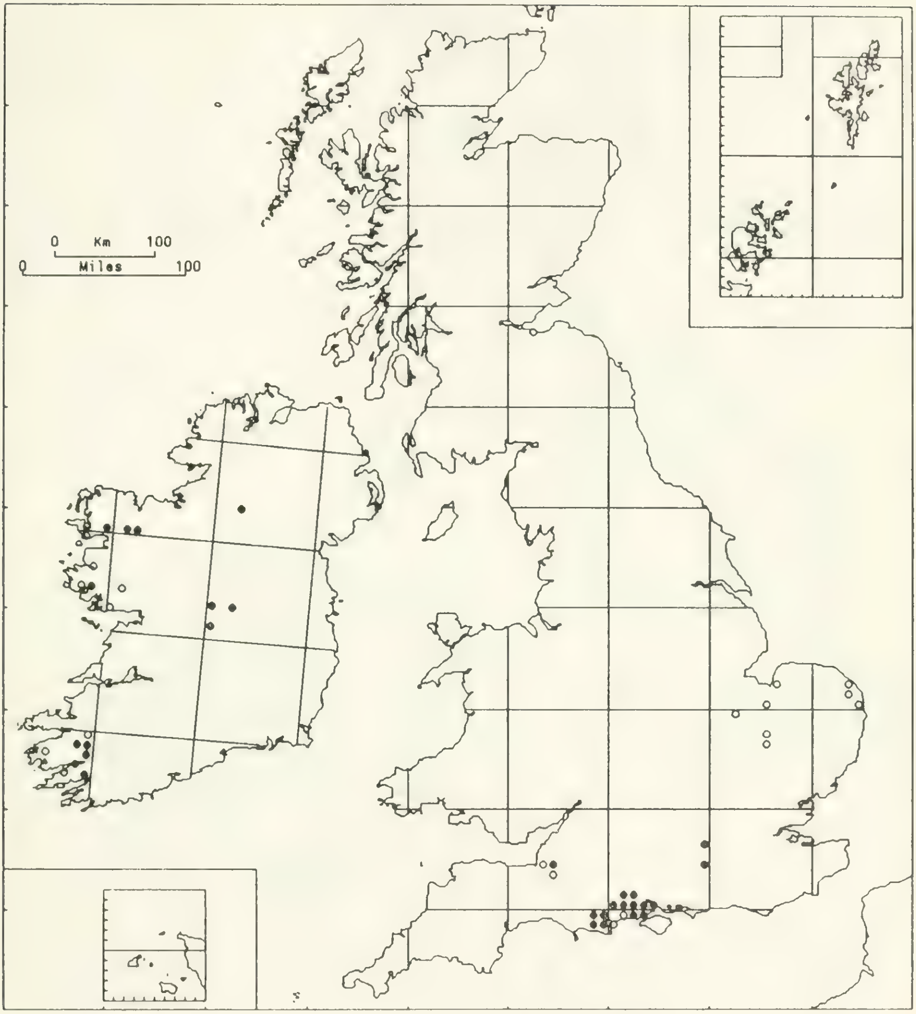

Figure 2. National distribution of the large marsh grasshopper *Stethophyma grossum* (Orthoptera: Acrididae). Open circles refer to records before 1970; filled circles represent post-1970 records.

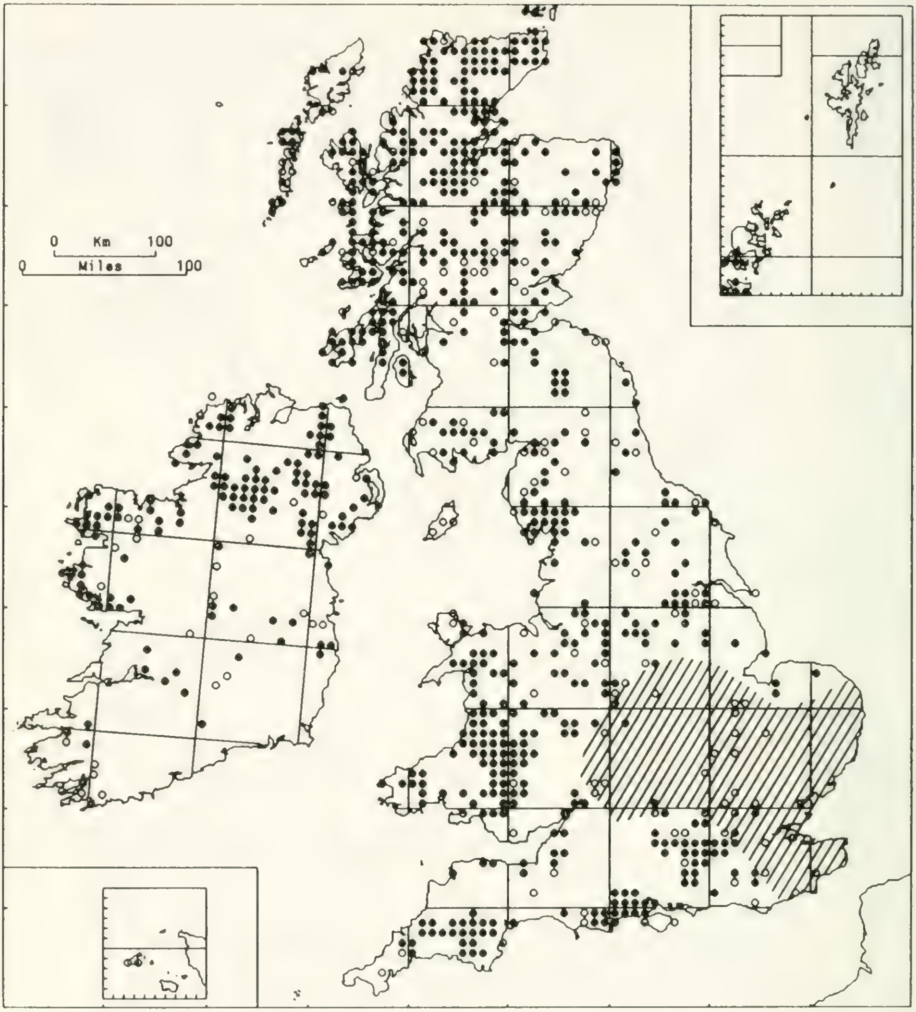

Figure 3. National distribution of the black darter dragonfly *Sympetrum danae* (Odonata: Libellulidae). Open circles represent pre-1975 and filled circles post-1975 records. Cross-hatching indicates the approximate area within which *S. danae* has become extinct in 50% of the squares it is known to have occupied in the past.

Table 2. Dates of last record for extinct Odonata and Orthoptera at Thorne and Hatfield Moors, South Yorkshire

Order and species	Last date
Odonata	
Cordulia aenea	1823
Anax imperator	1837
Leucorrhinia dubia	1890
Coenagrion pulchellum	1950s
Libellula depressa	1966
Orthoptera	
Conocephalus dorsalis	1837
Tetrix subulata	1837
Chorthippus albomarginatus	1975

Historical observations on the invertebrates of Thorne and Hatfield Moors are sufficient to document many of the changes which have occurred since 1820, when the visits of the first entomologists were recorded (Eversham & Skidmore, 1991; Skidmore, 1992). The extinctions which are known to have occurred in two orders, Odonata and Orthoptera, are shown in Table 2.

The history of the peat extraction industry on the two moors has also been documented (Limbert, 1985, 1986; Eversham, 1991). Peat digging before 1850 was for use as fuel, and caused the drainage of most of the deeper bog pools, and the loss of some of the fenny margins of the mire. At the same time, more intensive farming around the moors reduced the fenland belt still further. Large scale extraction of peat between 1890 and 1920 was for use as animal litter (bedding in stables); this modified the mire surface further, but also created new bog pools and a more varied topography. Until 1963, all peat was dug by hand, and transported by horse-drawn waggons or barges.

Mechanical peat extraction began in the 1960s, to supply the new market for horticultural composts. This has now removed over 70% of the vegetation from the two moors. The most recent technology, 'milling' of the peat surface, has kept over 1500 ha bare and dry since 1985. Pumped drainage associated with milling is now threatening the hydrology of the vegetated parts of the moors, even though these are designated as a national nature reserve (Meade, 1992). Each of the changes in the technology of exploitation has been marked by changes (mostly extinctions) in the invertebrate fauna (Eversham & Skidmore, 1991).

INDIVIDUAL SURVEYS

If the status of a particularly prominent species is believed to be changing drastically, individuals or organizations may be prompted to carry out a limited 'one-off' survey to assess its distribution and abundance at that time. Most often, this will involve an uncommon or putatively declining species. For instance, Farrell (1975) organized a two-

year survey of the previous English sites for the chequered skipper butterfly (*Carterocephalus palaemon*). None was found in England, confirming the suspected decline in England, but populations in Scotland appear to be stable (Thomson, 1980; Emmet & Heath, 1989). A practical consequence of this survey was protection for the species under the Wildlife and Countryside Act 1981.

Another species which has attracted several surveys over the past 25 years is the glow-worm (*Lampyris noctiluca*). The British Naturalists' Association has surveyed this species' distribution repeatedly (Wootton, 1969, 1971, 1972, 1974); another survey was carried out in the late 1970s (Tyler, 1979); and in June 1991 *BBC Wildlife* magazine advertised a survey. The difficulty in interpreting the results of surveys of this *ad hoc* kind arises from the considerable (but unmeasured) differences in recorder effort and distribution (and possibly also competence) between one survey and the next. The glow-worm is also included in the Biological Records Centre scheme for the Cantharoidea and Buprestoidea (Alexander, 1992), so a complete collation of data from the various sources may eventually be possible.

Recently, individual surveys of expanding or colonizing species have been proposed. The most intensive is that for the firethorn leaf-miner (*Phyllonorycter leucographella*), organized by staff at the Centre for Population Biology, Imperial College, Silwood Park. The species has reached Britain recently, and it is hoped to model its invasion and spread, with the help of large numbers of non-specialist observers, reached through television, newspapers and popular magazines, as well as the natural history literature.

Research ecologists will usually gather some distributional data while undertaking any autecological study. In the case of very rare species, this may amount to a complete census, e.g. Cherrill and Brown's research into the ecology of the wart-biter bush-cricket (*Decticus verrucivorus*) (Cherrill & Brown, 1990).

NATIONAL RECORDING SCHEMES

The current range of national recording schemes is described by Harding & Sheail (1992), and updated lists are produced annually by the Biological Records Centre. The use of national schemes for invertebrates in nature conservation has been reviewed by Harding & Eversham (1989), and the role of schemes in monitoring is described by Harding (1990).

Many national recording schemes are collating museum and literature records thoroughly, which enables the long-term changes in status of species to be assessed, as in the three examples above. National recording schemes can also reveal short-term changes in species range or abundance. The recent range expansions of several butterflies has been monitored by the BRC/BBCS butterfly recording scheme; the northward spread of hedge brown (*Pyronia tithonus*) has been analysed by Pollard (1991, 1992).

Targeting species

An active recording scheme may produce one or more newsletters for recorders each year. These provide a means of drawing attention to possible changes, and encouraging recorders to concentrate on particular species. This method of guiding recorder effort has not yet been widely used, but the Orthoptera scheme successfully followed the range expansion and increased frequency of long-winged forms (macropters and extra-macropters) in Roesel's bush-crickets (*Metrioptera roeselii*) and long-winged conehead (*Conocephalus discolor*) in 1989-1991 (Haes, 1990). Similarly, the Spider Recording Scheme has recently sought information about the large and colourful species, *Argiope bruennichi*, which may have expanded its range in response to two hot summers, and subsequently declined in 1992 (Merrett, 1992).

Targeting sites

Certain exceptional sites have always figured prominently in invertebrate recording. Since the establishment of nature reserves, these have also provided a focus for many recorders. At these sites, invertebrates in a wide range of groups may be used to monitor changes in the site, and are proving the most sensitive indicators of site management. For instance, at Thorne Moors, among the muscid flies, the decline in wet-peat species, such as *Phaonia jaroschewskii*, discussed above, was accompanied by a marked increase in flies typical of dry heathland, such as *Helina evecta*. This provided the first unequivocal sign that the national nature reserve was drying out because of adjacent peat extraction (Skidmore, 1992).

The Odonata Key Sites Project, launched in 1988 (Merritt, 1987), attempts to direct recorders to the most important sites. Key sites are defined by the presence of nationally or regionally rare species, or a regionally important assemblage of species. A database of over 100 000 records of Odonata already exists, so the broad patterns of species distribution are well known (Merritt *et al*., in press). This large database has been used to identify potential key sites, which recorders will visit. The aim of the project is to provide proof of breeding of the important species, and if possible, some estimate of numbers.

The Botanical Society of the British Isles' monitoring scheme operated from 1987 to 1989. It established a baseline for future monitoring, and resurveyed a 1-in-9 sample of the 10-km squares of the O.S. grid, for comparison with the 1950-1960 survey (Perring & Walters, 1962). Three tetrads (2-km squares) were selected within each 10-km square and were surveyed in more detail. By limiting and standardizing the effort required in this way (Rich & Woodruff, 1990, 1992), a survey is more likely to be repeatable in the future, to monitor changes.

REGULAR MONITORING — THE BUTTERFLY MONITORING SCHEME

All the surveys discussed above rely mainly on amateur recorders working voluntarily, and do not attempt to lay down in detail how and when recorders should do their fieldwork. The Butterfly Monitoring Scheme (BMS) operates to a more rigorous protocol (Pollard, 1977; Hall, 1981). It requires recorders to count all the individuals of each butterfly species along a measured transect, and to walk the transect in suitable weather conditions once each week, every week from April to October, and to repeat this every year. The scheme receives data from around 100 sites each year, and many of the sites have been providing information for over 10 years. Most recorders are nature reserve wardens.

Detailed monitoring of this kind has many advantages because a reliable index of abundance of each species is produced, and year-to-year changes at each site can be detected. These may be related to national trends, which may be caused by weather patterns (Pollard & Lakhani, 1985; Pollard, 1988), or be due to the effects of management at an individual site (Pollard, 1982). The research applications of a long-term monitoring data-set such as the BMS are considerable (Pollard & Yates, 1993).

The greater input of recorder effort, and the necessary lack of flexibility over timing of visits and the method of recording makes the BMS approach less suited to amateur recorders. In addition to the 100 or so 'official' BMS transects there are many others, operated by amateurs, but few of these meet the requirements of weekly visits throughout the season, and most do not operate effectively for more than three or four years.

No other invertebrates have been subject to the degree of detailed monitoring provided for butterflies by the BMS. However, a recent survey of monitoring activities showed that there are many sites where high quality data are being gathered for Odonata, and for several of species in other taxonomic groups (Croucher, 1992).

CONCLUSIONS

Provided that the historical record is adequate, invertebrates are as valuable as plants and vertebrates in the detection of long-term changes. This result may be achieved without the data being collected with this particular aim in mind.

Unlike most plants and vertebrates, many invertebrates respond very rapidly to environmental changes, and this response may be reflected in their national distribution.

If the suite of species for monitoring is well chosen, invertebrates may be used to detect very subtle changes within a site, changes so slight that vascular plants and vertebrates may not respond measurably to the change for many years. Ideally, the suite of species will include some which respond positively (increase in numbers) and others which respond negatively to the change in question.

There are so many species of invertebrate in Britain that there are likely to be suitable species to monitor almost any change in land use or site management. This diversity of potential uses emphasizes the value of data collection for the widest possible range of species.

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OPERATING A RECORDING SCHEME

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INTRODUCTION

The water beetle recording scheme was officially launched in 1979 under the auspices of both the Biological Records Centre (BRC) and the Balfour-Browne Club, a group devoted to the study of water beetles. Preparatory work for the scheme had been going on since 1972, when the prospect of a national scheme, as opposed to a series of local schemes, was first contemplated. Initial work involved transfer of as much as possible of Professor F. Balfour-Browne's vice-county recording data onto BRC record cards. Thus, a good base of records, albeit mainly pre-1950, was quickly acquired so that the prospect of complete coverage of Britain and Ireland was possible.

TAXONOMY

Water-living beetles occur in several families of which a few are exclusively aquatic (Haliplidae, Hygrobiidae, Noteridae, Dytiscidae, Gyrinidae — the Hydradephaga; plus the Hydraenidae and Elmidae) and some are almost exclusively amphibious (Hydrophiloidea, Dryopidae). Smaller groupings such as the Donaciinae and aquatic weevils have later been added to the record card so as to get fuller site lists, and others (e.g. Microsporidae, Georissidae) have been added for the sake of convenience and completeness. Others, particularly the Scirtidae, have been left off for the sake of convenience too! This follows the tradition of Balfour-Browne, who ignored aquatic *Cercyon* and riffle beetles (Elmidae) during a lifetime of fieldwork. However desirable it might seem to the outsider to have a recording scheme based on habitat, most of the beetle recording schemes are based on particular families.

It is not easy to specify how many water beetles species there are if one records by habitat rather than by family. The present record card lists 323 species. Since 1972, 14 species have been discovered new to the British fauna. Seven species reckoned to be extinct have been rediscovered. Of the new species six have been 'de-lumped', i.e. recognized as having specific status in complexes lumped together by Balfour-Browne. A source of unexpected new species has been the 'monospecifics', i.e. species considered to be so distinct that no-one in the past had checked whether they might comprise a cryptic species-pair. There have been several examples among water beetles, the most recent being *Hydrochus megaphallus* van Berge Henegouwen, recognized as distinct from *H. brevis* (Herbst)(van Berge Henegouwen, 1988). The subtle habitat and distributional segregation associated with such sibling species make them the most interesting to record on a national basis.

Most recorders are only too willing to accept the need for name changes if these involve additions to the fauna, but they are less inclined to accept the endless series of name changes rendered necessary by interpretation of the International Code of Zoological Nomenclature (ICZN). There have been 17 changes in specific epithets since 1972 and that does not include the comparatively trivial change from names ending in '-i' to '-ii'. Revisions of genera have resulted in eight generic name changes, one of which has caused a species to lose its name completely when it coincided with a change in the specific epithet

as well. One genus, *Potamonectes* has recently changed in name for the second time — to *Nebrioporus* (Nilsson & Angus, 1992). Such changes should be welcomed as they demonstrate the intensity of academic study on the group. An important victory for ecologists in 1990 was conservation of the name *Helophorus brevipalpis* Bedel for the commonest British water beetle when ICZN suppressed an earlier, unused name that should have had priority (ICZN, 1991). Taxonomists care about stability and they change names only when absolutely necessary.

QUALITY OF RECORDS

Record quality is one of the most time-consuming aspects of running a scheme and it is dangerous, but necessary, to make some generalizations about it. The ability to use keys accurately appears to be a gift not necessarily associated with academic ability — perhaps it is more to do with either patience or focal length! However, willingness to accept that one could have made a mistake, and that therefore it is necessary to keep vouchers and to submit them for expert identification, must surely be associated with some aspect of intelligence. Coleopterists keep voucher material because, for most, the collection is an underlying reason for the activity. It has to be said that the worst quality records appear in some learned journals; many professional ecologists attempt to cover too many groups of organisms without seeking expert guidance; voucher material, if retained at all, tends to be lost at the end of a research project or contract. Editors of learned journals would do well to extend refereeing to include the correct identification and preservation of voucher specimens.

Voucher preservation

Coleopterists mount on cards or pin dried material and accumulate series of each species. This makes comparison between specimens very easy, but these fragile husks are difficult to dissect. Professional ecologists tend to preserve site collections of aquatic material in either alcohol or formalin. Compromises between these two approaches are unsatisfactory. Specimens stored loose in tubes achieve only the main purpose of long-term storage of vouchers. Specimens stored individually in spirit take up too much space and are not easily compared.

The best policy must be to have both a dry-mounted collection organized by species and alcohol-preserved material, even of the commoner species, for each site visit. Constant reference to the dry material maintains awareness of species differences whereas the spirit collection, which need not occupy much space, proves invaluable when cryptic species-pairs and similar problems are later recognized.

Correct identification

The streamlined shape of many water beetles makes it difficult to provide keys based on general appearance. Size is, however, of considerable value in reducing the number of possibilities when running a specimen through a key. Many beginners do not appreciate this and mistakes in using Laurie Friday's keys (1988) often stem from failure to use the size chart provided.

Simple keys do not work within many genera, and some species cannot be identified without dissection of the genitalia. Usually the male genitalia are the more distinctive, but occasionally female genitalia, particularly in whirligig beetles (*Gyrinus* spp.), are also of value.

Field experience allows one to recognize each species by a series of characters concerned with colour, size and shape. Occasionally added to this array are the behaviour of species (e.g. the way in which some species hide in netted debris whereas others attempt to escape), the way in which water runs off the body (e.g. in streaks over the elytra of

Agabus with elongated reticulation patterns) and even characteristic smells, such as those of *Ilybius fenestratus* and *I. aenescens*. With this experience comes the ability to assemble large lists at sites without the need to destroy many of the commoner species.

Identification service

This free service to Club members is important in maintaining interest. In the period September 1984 to August 1992, 47 438 specimens in 382 batches were identified by the author, to which must be added the voluntary identification work of other members. The scale of the exercise underlines the risk of generating errors. Even if identification was 99% accurate, about one beetle has been misidentified each week for 10 years. To this must be added the risk of clerical error, usually committed when transcribing data, by striking through the wrong species names on the card.

Record age

The usefulness of a data-base varies with how it is used. The decision-maker concerned with habitat protection wants to know about the present state of a site, though he or she might be prepared to overlook the age of records if intent on making a case for conservation. The rapidity with which sites of conservation value have been damaged from the 1970s onwards has caused conservationists to question the value of maps distinguishing records before and from 1950 onwards. Narrowing the distinction to post-1970, or as often requested now, post- 1980 records, usually demonstrates the patchy decanal coverage rather than providing useful information on the extent to which a species is changing in distribution.

The best way of distinguishing the traditional amateur entomologist from the one primarily concerned with conservation ought to be the weight placed on records. The enthusiast undoubtedly reveres the **first** record for an area whereas the conservationist should surely value most the **last** record.

This logic might force us to the disagreeable conclusion that we are all mere collectors rather than true conservationists. However, there are not enough recorders to monitor sites, and some of us rarely visit the same site twice, claiming as an excuse the need to achieve better coverage. The compromise must be for rarer species to be repeatedly 'rediscovered' in order to maintain interest, and this is precisely what happens.

The other compromise is that more effort has been put into acquiring new records for the scheme rather than scouring museum collections and journals for old records. The entomologist adopting the traditional approach will always be able to identify gaps in the maps based on older records.

Quality and the computer

The problems of inputting and retrieving data are beyond the scope of this article, largely because none of the estimated 170 000 records* is computerized, except for the purposes of assemblage analysis. This is not because of any Luddite attitude, but simply

* Note added in proof

Since this paper was written, about 15 000 water beetle records have been entered on computer using the RECORDER package (Ball, S.G. 1992. RECORDER Version 3.1. Peterborough: English Nature). These records cover north-west England and the work was supported by JNCC. Henceforth, all newly acquired records will be computerised as soon as they are received. Funding is being sought on a regional basis to computerise the remaining 155 000 records.

through lack of sufficient resources at BRC. Having said that, it is important to note that there is no such thing as a 'backlog' in the sense of data awaiting input to a computer. Records received are immediately transferred to dot maps by hand, and the filing cards are soon stored in order of grid reference, site and date. Records for a site can be retrieved as quickly from a filing cabinet as from a computer data-base. Unfortunately, one decision taken as a short cut at the outset of the scheme was not to keep maps for the commoner species. To attempt to assemble such maps without the aid of a computer would now be absurd. The other main reason for data input to a computer, despite the potential for yet further transcription errors being incorporated into the data-base, is to replicate the information. Network access to the data-base, if that involves interpretation of data by uninformed staff, is looked upon as a disadvantage rather than an advantage.

QUANTITY AND COMPLETENESS

Records of aquatic Coleoptera are acquired by several types of people. The tradition of amateur collecting of Coleoptera is best developed in Britain and Germany. Professional entomologists visiting the UK usually express surprise and envy at the intensity of beetle recording. The accuracy with which amateur coleopterists identify beetles is unfortunately often offset by proprietoriality and a reluctance to reveal the secrets of what is essentially a secretive and individual pursuit. Another problem is that such enthusiasts have no interest in common species and so fail to make complete lists during site visits.

Professional limnologists, on the other hand, usually attempt to record all taxa at each site, and rarely spend enough time searching for Coleoptera, many species of which are confined to extremely shallow water not easily worked by sweeping with a pond net.

The most comprehensive lists are provided by specialist enthusiasts, of whom the first was Professor Balfour-Browne. Within any decade this century, rarely more than two or three such recorders have been active. Even now, the 'inner core' of those whose site visits are almost exclusively dedicated to water beetles is small. Some of the most effective are visitors to Britain, who record more avidly than local entomologists, just as a British collector might make the most of a stay abroad. The water beetle data-base is best used as an accumulation of records; we are not really in a position to provide 'snapshot' surveys of common species though recent collaboration with the Institute of Terrestrial Ecology's Countryside 1990 Survey has demonstrated that this is possible with sufficient resourcing.

REASONS FOR RUNNING THE SCHEME

One is always tempted or even coerced into providing a rationale for one's actions. As far as assembling a large recording database is concerned, it is important to identify natural curiosity as the first reason for recording activity, the second being that such an outdoor pursuit provides a substitute for the atavistic pleasure of hunting. To quote Charles Darwin (1871): 'Whenever I hear of the capture of rare beetles, I feel like an old warhorse at the sound of a trumpet'.

The collecting instinct, for the beetles, the records or both, should be added and the whole summarized as 'fun'. If recording can in some way be used to insure that future generations also enjoy the same degree of pleasure then there is plenty of justification for the activity. However, if the mapping scheme organizer contributes most of the time and effort without charge, 'Why not?' is as good a reply as any to 'Why?' What follows is a bonus.

Speculation about distribution

Some people, including scientists, appear to derive pleasure from speculation. Speculation as to why animals are distributed in the way that they are is a popular activity,

unfortunately often rendered disagreeably contentious by adherence to a favourite theory. It can be claimed that water beetle distributions fall into a limited number of types. Balfour-Browne (1940) recognized five (British, English, South-East, South-West and Scottish) as a result of his British vice-county recording programme for Hydradephaga. Despite intensive recording since then, with many exciting discoveries, the distribution of most species still conform to the types identified by Balfour-Browne. Certain unusual distributions detected by Balfour-Browne, e.g. that of *Agabus didymus* (Olivier) being found much further north on the east side of Britain than on the west (Figure 1), are almost identical to the present 10-km maps (Figure 2). Balfour-Browne (1950) commented on *A. didymus* as an example of a species 'gradually spreading westwards and northwards'. The commonness of the species on Anglesey (where Balfour-Browne could not find it in 1914) and recent records for Lancashire might be seen as fulfilling this prophecy. Balfour-Browne also stated that he 'would not be surprised if, within a few years, the species is recorded from south-east Scotland, if anyone is enthusiastic enough to do some special collecting in that area.' He did not then know of specimens taken at Coldingham in 1939, but not identified until much later (Owen, 1952).

At that time, Balfour-Browne entered into controversy with Dorothy Jackson, whose studies on flight capacity (Jackson, 1952) indicated that many species were not at all dynamic in their distributions. Subsequently many of Jackson's 'flightless' species have been found to include individuals capable of flight.

However, the basic idea remains that some distributions can be explained as the residue of wider ones associated with optimal conditions for many warmth-loving species occurring after the retreat of the ice cap. Balfour-Browne's ideas of constant reinvasion and movement hold good for pioneer species, with at least one well-documented example of a species colonizing Britain (*Coelambus nigrolineatus)* (Steven) in man-made quarry ponds and gravel pits, first found in 1983 by Carr (1984) in East Kent, and now known from East Sussex, Oxfordshire, Suffolk and Northamptonshire).

Special recording problems

Certain distributions, in particular those of some subspecific forms, are of special interest and have potential for interpreting the ways in which Britain has been colonized by insects. These forms provide an opportunity for enthusiasts to contribute to studies of distributional phenomena, supplementary to specialist studies of Holocene subfossil material and genetic diversity.

Two forms of *Nebrioporus* (formerly *Potamonectes*), *depressus* Fab. and *elegans* (Panzer) can be differentiated with confidence only by reference to the aedeagus, broad- and blunt- ended in the former and narrowly tapering in the latter. Where these forms coexist, in southern Scotland (Balfour-Browne, 1919) and in northern Germany (Franck, 1935), they intergrade in morphology, with some sites characterized by particular grades within what has become known as the '*depressus-elegans* complex'. The true *N. depressus* occupies relict lochs (and Talkin Tarn in Cumbria) and *N. elegans* may occupy neighbouring running water and man-made lakes, the presence of intergrading forms suggesting a dynamic balance between the two (Shirt, 1981). This idea is strengthened by the true *N. elegans* being absent from Ireland, where *N. depressus* occupies a much wider range of habitats.

Some dytiscids have females with two different forms of microreticulation. The finely reticulate, matt forms tend to be northern in distribution, e.g. *Agabus uliginosus* var. *dispar* Bold, with the shiny, male-like forms being southern. An interesting exception is *Hydroporus memnonius* Nicolai, the matt form of which (*castaneus* Aubé) being the commonest British form, with the male-like form being restricted to Ireland, Anglesey, most of Scotland, and some sites in Wales and the Lake District. The transition zone is in the area of the Scottish/English border with both forms coexisting over a wide area. This suggests that the matt form colonized Britain later than the shining form. It is thus important to record such forms, particularly in the case of *H. memnonius*, where the shining form can be regarded as having greater conservation value.

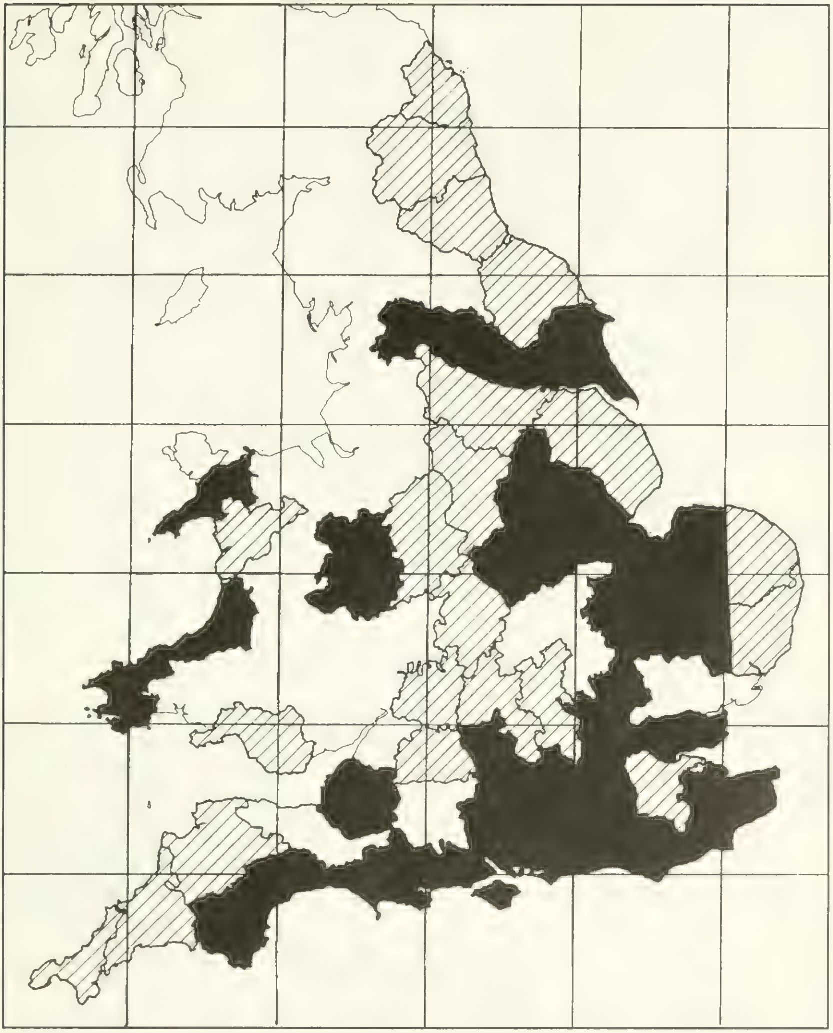

Figure 1. The vice-county distribution of *Agabus didymus* (Olivier) (Coleoptera, Dytiscidae) as recorded by F. Balfour-Browne (1950). Black areas represent vice-counties for which Balfour-Browne had confirmed records; hatching represents unconfirmed records.

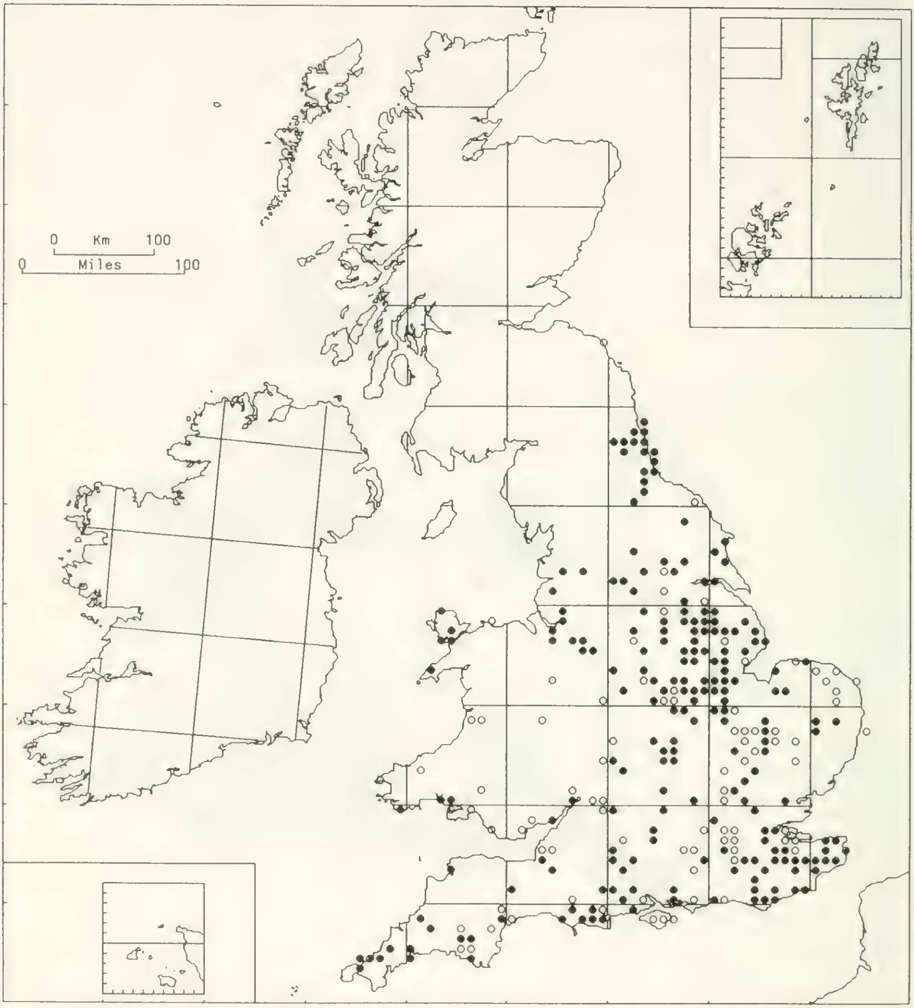

Figure 2. The 10-km square distribution of *Agabus didymus* as known in 1992. Open circles refer to records before 1950; filled circles represent post-1950 records.

The most interesting example of cryptic species also illustrates some of the problems of the recording scheme. Van Berge Henegouwen (1986) split the commonly occurring hydrophilid *Anacaena limbata* (Fab.) into two species, *A. limbata* s.s. and *A. lutescens* (Stephens), mainly on the basis of the hair cover of the hind femora, an underside character not visible in dry-mounted material (and often obscured by glue when a specimen is dismounted). Thus records of '*Anacaena limbata*' previous to this discovery largely became redundant. This is an important reason for dating the completion of a card, something that is still not being done! Laborious reinspection of dry-mounted museum material is, of course, possible, but such common species are not usually well represented in collections. It has proved far more effective to re-examine alcohol- preserved material, for which there is less inhibition about accumulating common material, and which can be identified more easily than card-mounted specimens. It will be interesting to see to what extent Coleoptera enthusiasts have begun to mount hydrophilids on their side or upside down in the interests of assisting identification.

Van Berge Henegouwen also noted that males were generally rare in *A. lutescens*, and had not been detected in acid waters. Shaarawi and Angus (1991) have subsequently demonstrated that a dark female form has a different karyotype from *A. lutescens* females associated with males, one chromosome pair being heterozygous, with a high proportion of individuals being triploid. Thus our cryptic species pair apparently includes a third member, the parthenogenetic female form of *A. lutescens*. This raises another problem for the recorder. As the aedeagi of *Anacaena* have not proved useful in identification, they are rarely dissected; dry-mounted material can sometimes be sexed, but one really wants a series of specimens from each site in order to increase the probability of proving whether or not a population is bisexual.

The distributions of *A. limbata* and *A. lutescens* (Figures 3 and 4), derived from a smaller data-base than for most water beetle species, are clearly different, with *A. limbata* being the fenland drain species. *A. lutescens* is the more widely distributed species, and males, although common in Northern Ireland, have not yet been detected from Scotland or northern England.

Other reasons for recording

Apart from the pleasure of acquiring and speculating about records, a rationale for running a scheme which results in species mapping can be summarized easily:

1 to validate rarity/vulnerability statuses of species and sites;
2 to aid interpretation of species' requirements;
3 to provide a data-base so that changes can be detected;
4 to identify and thus to promote the study of unrecorded areas;
5 to link to other European mapping schemes.

It is also important to identify the way in which a fuller use can be made of the data-base by analysing species lists.

Assemblage analysis

The well-defined nature of most aquatic sites, and the diversity of beetles associated with virtually all non-marine aquatic habitats, provide the potential to evaluate all wetlands in a single analysis of water beetle site lists. Some 2 100 lists have so far been analysed on a regional basis in Britain (Foster & Eyre, 1992). About 300 have also been analysed for Ireland (Foster *et al*., 1992). The classification of lists into groups can be achieved objectively by use of TWINSPAN (Hill, 1979a) and other programs of multivariate analysis. Once divided into groups, the site lists can be ranked using a species-quality score and other attributes (Foster *et al*., 1989, 1992). It is thus possible to offer a rationale for site selection for conservation, including a structure within which to place lists from newly recorded sites and damaged sites.

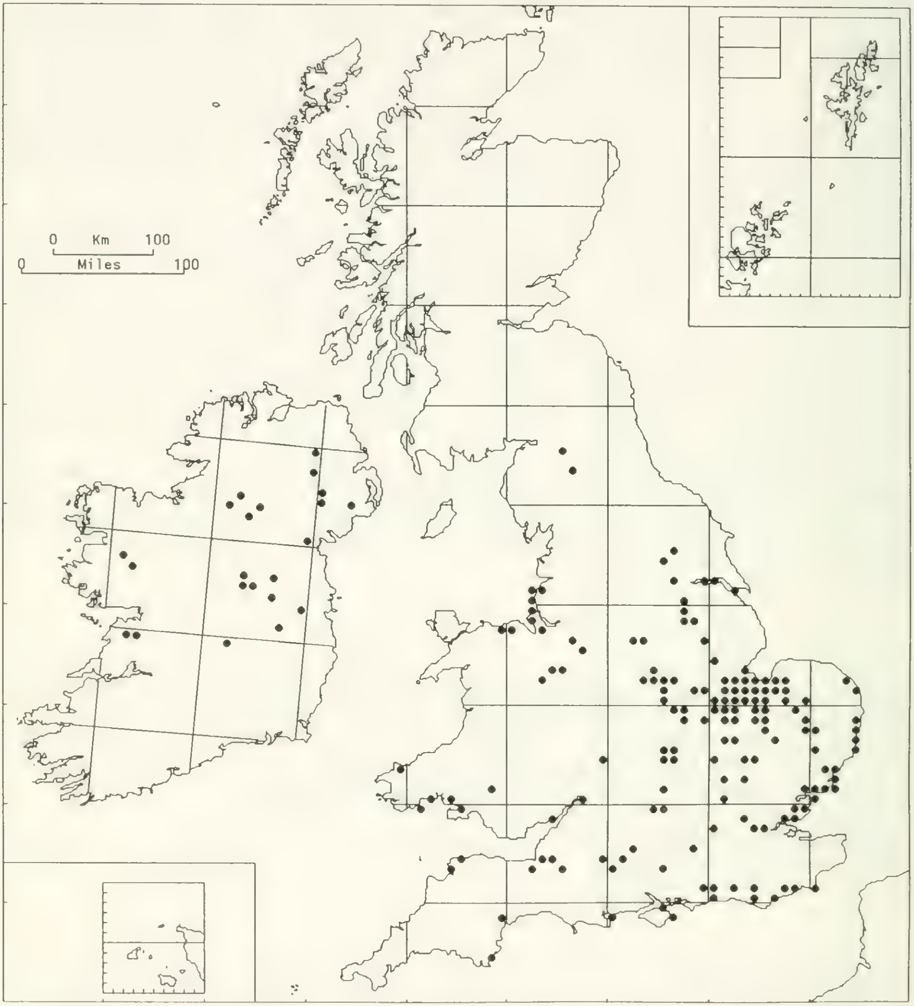

Figure 3. The 10-km square distribution of *Anacaena limbata* (Fab.) s.s. (Coleoptera, Hydrophilidae). Filled circles represent all records regardless of date.

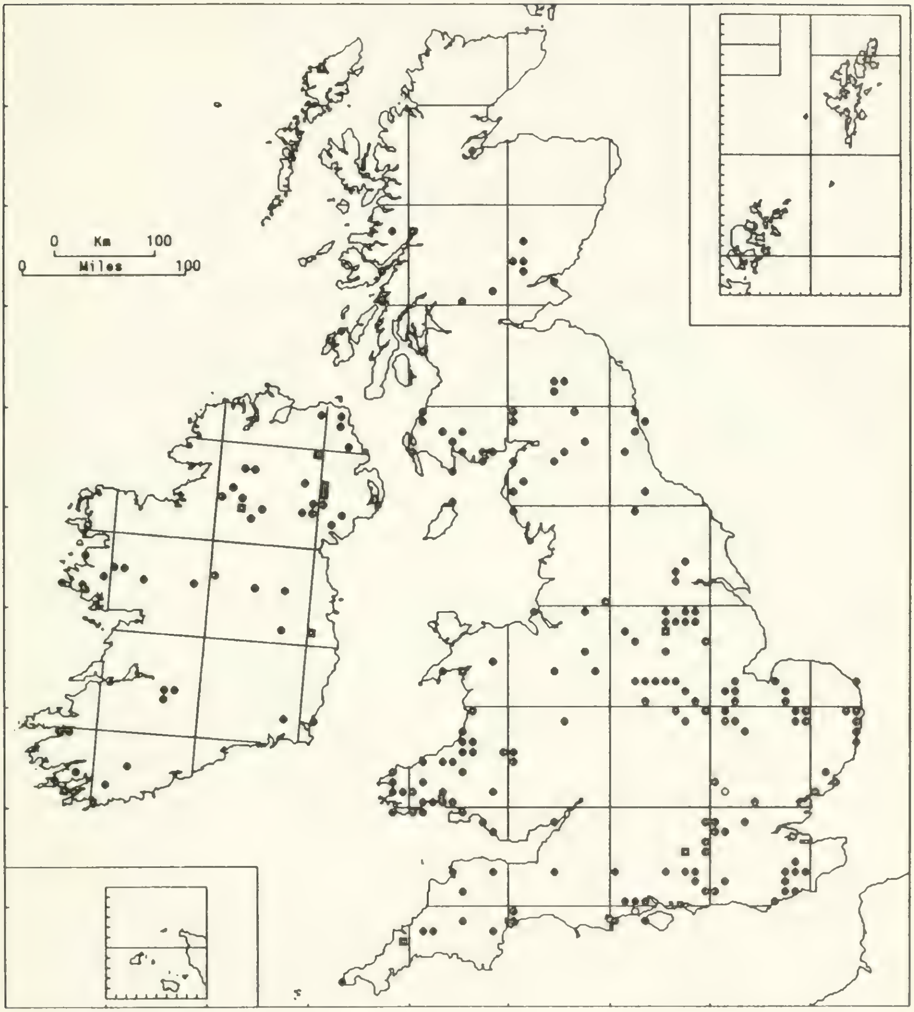

Figure 4. The 10-km square distribution of *Anacaena lutescens* (Stephens) Coleoptera, Hydrophilidae), males being indicated where recorded, by a filled square. Open circles represent records before 1950; filled circles represent post-1950 records.

The multivariate approach is also important in identifying the ecological variables dictating community type and species preference. Detrended correspondence analysis (DECORANA — Hill, 1979b) can be used to ordinate sites and species on a series of axes which represent the hierarchy of environmental gradients dictating community type. Obvious environmental factors, such as salinity, flow and substratum are identified as important in most such analyses, but this objective method of analysis often identifies the importance of water permanence and distance from permanent water bodies. GLIM (Generalized Linear Interactive Modelling — Baker & Nelder, 1978) has been used to analyse the probability of occurrence of individual species as adults and larvae in relation to site water duration (Eyre *et al.*, 1992).

In the absence of experimental evidence to validate site management policies, these multivariate analyses of simple presence/absence data provide a basis for sound advice on management. Much of what is advised about aquatic insect conservation is at present based on preconceptions and anecdote (Foster, 1991).

COVERAGE AND FINANCIAL SUPPORT

The extent of coverage of the scheme is better than for most insect recording. Gaps are mainly in Ireland, northern Scotland and the drier parts of England. The situation would be worse were it not for financial support from The Environmental Research Fund to cover intensively agricultural parts of the drainage into the Wash (Foster *et al.*, 1989), the Praeger Fund and the Department of the Environment for Northern Ireland to survey sites in Ireland (Foster *et al.*, 1992), and the British Ecological Society to survey parts of the Western Scottish Mainland (Foster, Spirit & Counsell, 1991). By offering financial support to catalogue collections, some museum services have been instrumental in improving historical coverage of certain areas, but usually not those in which the museums are based!

In its day, the Manpower Services Agency (and related programmes) supported biological surveys which occasionally produced excellent results, in particular that in Caithness and Sutherland (McCann & Moran, 1986).

The erstwhile Nature Conservancy Council (NCC) generated many records for the scheme, by staff employed as entomologists and by occasional funding of surveys (eg Islay — Foster & Eyre, 1988). NCC's staff have been particularly active in surveys of threatened fenlands (e.g. the Somerset Levels — Drake, Foster & Palmer, 1984). Latterly NCC supported the classification and ranking of sites using water beetle assemblage data acquired for the recording scheme, subsequently published by the Joint Nature Conservation Committee (Foster & Eyre, 1992). It remains to be seen whether the country agencies will continue to support studies on water beetles.

It is important to acknowledge the help of staff of the Biological Records Centre in production of record cards and those Balfour-Browne Club newsletters concerned with presentation of preliminary editions of maps.

Having acknowledged financial and logistic support from other organizations, and in particular from certain Club members, it has to be said that, as with most other recording schemes, this one relies for its financial support and continuity on one individual, usually with a long suffering family.

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THE ROLE OF LOCAL MUSEUMS IN TAXONOMIC SUPPORT

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INTRODUCTION

Taxonomic problems are often cited as an obstacle to the use of invertebrate groups for site evaluation and environmental monitoring. These problems vary from group to group. For some groups, Protozoa being an example, a large proportion of species are undescribed and a major basic taxonomic research programme is required (Clark, 1976). However the British fauna of most macro-invertebrate groups is much better known and the taxonomy of most groups has progressed beyond the descriptive phase. Recent progress has been either nomenclatural or involved the splitting of a relatively small number of closely related species (see, for example, Foster this conference). The main problems with the use of macro-invertebrate groups relate to lack of accessible identification keys and shortage of invertebrate specialists with the necessary knowledge of sampling methods or identification skills.

Unfortunately, the popularity of taxonomy has undoubtedly declined and it is now sometimes regarded as old-fashioned and in the case of invertebrates tediously difficult. Heppel (1979) noted that in zoology there has been a trend away from taxonomy and a lack of awareness of its importance to other types of zoological work, but points out that scientific work can be rendered irrelevant if its taxonomy is inaccurate or imprecise. The failure to appreciate the importance of taxonomy to ecological and environmental studies is a threat to our abilities to understand the environmental changes which are becoming increasingly apparent and which are currently giving cause for public concern.

The prominent role of the national and university museums in pure taxonomic research is widely acknowledged (Smith, 1979). Less well understood is the taxonomic support provided by local museums, which are run mainly by local authorities. It is in the field of applied taxonomy, rather than pure taxonomic research, that local museums have traditionally operated and it is in this area that they have most to offer in the future.

INVERTEBRATE STUDIES AT LEICESTER MUSEUM

Local authority museums first appeared following the 1845 Museums Act which allowed municipalities to levy a half-penny rate to run museums for 'the instruction and amusement' of the public. However, many of them have their origins in literary and philosophical societies and similar organizations which appeared in the early 19th century. From the start, local museums were involved with the increasing interest in local faunas which formed the basis of many notes published in new journals such as the *Zoologist* and the *Entomologist*.

At various times in its history the museum at Leicester has played an important part in encouraging and enabling local naturalists to study natural history. In the 1840s, Leicester Museum was associated with developing the interests of the young Henry Walter Bates who befriended the curator John Plant. Bates left school at 13, but continued his studies at the Mechanic's Institute whilst working from 7.00 am to 8.00 pm each day as a hosiery apprentice. At 17, Bates began to study the local beetles before embarking on his famous voyage to the Amazon with Alfred Wallace (Moon, 1976).

Entomologists from a variety of social origins continued to use the resources at the museum in order to pursue their interest. In 1875, 'Mr G. Robson, the artisan Naturalist has undertaken to study and collect the Water-Beetles, and the Society has supplied him with apparatus for the purpose' (Mott, 1876). At the same time, Mr T. Burberry Forrest, a gentleman from a quite different walk of life, was engaged in the rearrangement of the Coleoptera collections. In the 1890s, the museum was associated with the resurgent entomological activity at Leicester and most of the 19th century material in the present museum collections date from this time.

For much of the 20th century, there has been no entomological society in Leicestershire and the museum became the place where budding entomologists met the previous generation and first had their enthusiasms kindled. In the 1950s, the museum started to act as a local biological records centre and formation of the County Lepidoptera recording scheme in 1975, by Don Hall-Smith, stimulated a major increase in local recording and interest. The Leicestershire Entomological Society was formed in 1988 and the museum has provided support for meetings and publications.

The involvement of Leicester Museum in local invertebrate studies is not unique; greater activity can be found in the histories of some other local museums. The main efforts of the museum at Leicester have often been directed towards the study of plants and vertebrates. Local museums have provided a vital service, especially to amateur natural historians who have played such an important role in the study of invertebrates.

TAXONOMIC SERVICES AT LOCAL MUSEUMS

The services provided by local museums include the use of equipment and libraries, publishing, and support for local societies, but perhaps the two museum resources of most value are the collections and staff expertise. A high proportion of most invertebrate museum collections come from local amateur collectors. Consequently, they constitute a valuable store of historical records. Comparison with modern records can suggest faunal changes. They also act as vouchers for records published by the collectors. The most frequent use of invertebrate collections however is as reference material. Identification of specimens is more likely to be correct when they are compared with reliably named material than when they are identified using only keys: this is especially true for those inexperienced in identification.

Staff expertise is a museum resource which is easy to overlook. However, individual staff with an infective enthusiasm can have a dynamic effect on the local scene. There are many active invertebrate specialists, both professional and amateur, whose interests were first encouraged and then sustained during visits to the local museum. The role of museums in developing the taxonomic skills of young specialists is especially valuable given the decreasing component of taxonomy in university curricula.

MUSEUMS IN CRISIS

Local authority services have come under increasing financial pressure in the last decade. To justify their expenditure, museums are now required to demonstrate the relevance of their services to the public in increasingly rigorous ways. Cuts in budgets have been suffered in recent years by almst all museums with natural history collections.

The taxonomic services provided by local museums has never enjoyed a high public profile. With the exception of public health enquiries, it is undoubtedly true that these services are often under-used. It is unfortunate that many invertebrate collections of value for taxonomic services are not very useful for these museum functions, such as display, which have a broader and more direct public appeal.

Consequently local natural history museums are facing a crisis especially with respect to the provision of taxonomic services. According to a survey in 1983 (Williams, 1987), of the 127 museums in the UK with natural history collections only 64 employed full-time specialist staff and only 49 were not constricted by staffing in providing an effective

service. On this basis over half of all British natural history museums are unable to provide an effective taxonomic service.

POTENTIAL FOR THE FUTURE

Natural history departments at local museums have responded to these pressures by taking on functions beyond their traditional roles. In the field of taxonomy this has involved two main initiatives, both based upon the development of local biological records centres at museums. The emergence of government training schemes in the 1980s gave the opportunity to employ young people to conduct biological surveys and to computerize the data form. This resulted in a spate of local atlases showing the local species distributions of a wide range of taxonomic groups. At the same time local site-based data-banks were set up and these have evolved into operations giving ecological advice to planning departments. In a similar vein museums are working with conservation organizations on site evaluations and management prescriptions. In recent years, Leicestershire Museums Service has undertaken work, using invertebrates, to monitor the effects of engineering works on a local river system, to monitor grasslands restored after open-case mining, to evaluate numerous sites subject to development proposals and to review the conservation interest of local sites within several habitat categories.

Many museums have now built up a valuable distributional and ecological data-base to complement their taxonomic resources. There is now abundant potential for an increase in their use by environmental and educational organizations. If your local museum provides a taxonomic service then one can only say 'use it or lose it'.

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NATIONAL FEDERATION FOR BIOLOGICAL RECORDING

The NFBR was launched at a conference in Cambridge in 1986 to raise the profile of biological recording in the UK.

It represents the concern of many scientists, conservationists and amateur naturalists that the importance of biological recording is not sufficiently recognised and that increased funding and greater co-ordination are needed.

The main aim of the Federation is to raise awareness of the importance of biological recording in all those organisations concerned with the environment and to secure funds to support this work. Also by bringing together the many agencies and individuals in biological recording the Federation hopes to improve their effectiveness in gathering, managing and disseminating biological information.

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